SAMPO ROSENLEW

SR 1046 PRO

Harvester

instruction manual

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2/2012
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Englanti

Introduction

The purpose of this book is to familiarize the operator with the forest harvester. It is of utmost importance that the operator becomes familiar with the structures, adjustments and maintenance of his harvester. Compliance with the advice and instructions given in this manual guarantees the best results at the lowest costs.

This manual provides descriptions of as well as operating and maintenance instructions for the forest harvester. The other manuals you will find useful when using and servicing your forest harvester include the instructions and spare parts catalogue for the harvester head, the instructions for the harvesting computer, the instructions for the crane, the instructions for the base machine control system as well as the engine manual and the spare parts catalogue.

Have these manuals always in the cab, in the special pocket reserved for them, for convenient reference. If, for some reason, they are not supplied together with the harvester, send immediately for new manuals.

Item ”Technical Specifications” has a description of all the features of the forest harvester in accordance with the delivery contract. It does, however, not include retro-fitted accessories.

The Manufacturer reserves the right to modify the structure, adjustments or accessories of the harvester as well as the service and maintenance instructions without further notice.

Sampo Rosenlew Ltd

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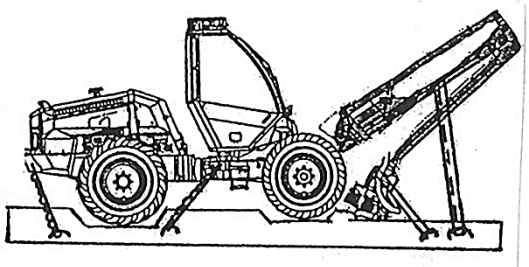
Safety precautions

Read carefully these instructions on safety and use before starting to operate the harvester. The time spent becoming familiar with the instructions now will save you money or may even spare you from injury.

Before accepting the delivery of the harvester, make sure it conforms to the delivery contract. Do not fit the harvester with any accessories not approved of by the Manufacturer. The Manufacturer of the forest harvester is not responsible for any damage or injury caused by such accessories either to people or property. If any information provided in this manual contradicts the laws and regulation of the country in which the harvester is used, local regulations are to be followed.

1. Transportation on a vehicle or by rail

Make sure you know the measurements and weights of the harvester and the transporter. Comply with any regulations concerning transportation.
Use increased tyre pressure, minimum of 3 bar, to improve stability.
Fix the harvester securely to the transporter.
For road transport lower the crane fully and fix it to the transporter.

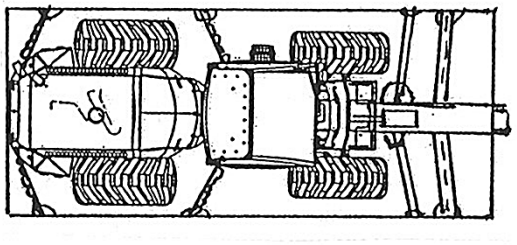


Harvester tying

Slow Vehicle sign

2. Driving in traffic

On public roads a transporter shall be used to move the harvester.
Remember that the harvester has articulated steering.
Test brake functions before driving on the road.
Wear the safety belt.
Never drive downhill with the gear in neutral.
Only shift gear on level ground.
Never carry passengers on the harvester.



Danger zone for Crane and harvester head

60 m

Never use the harvester for transporting goods.
If the harvester fault diagnostics detects a malfunctioning brake or drive pedal, the driver can still drive the harvester in for a service, but at a low speed and with slow crane movements.

3. Forest harvesting

Get familiar with the structure of the forest harvester by studying the manual before starting harvesting.
Make sure the protective guards are properly attached and in good condition.
Sound the signal to warn people around the harvester before starting the engine.
Never use the forest harvester for anything except harvesting trees.
Manual feeding of trees into the harvester head is forbidden.
Before starting, particularly reversing, make sure that everybody nearby is aware of your intentions.
Fasten the seat belt. This is important, particularly when driving across steep terrain.

Test the brakes as soon as you start, and stop immediately if the brakes or steering operate defectively.
Never adjust the seat or joysticks while driving.
Never leave the cab while the harvester is moving.
Never leave the engine running unattended.
Beware of the crane and the moving parts in the harvester head.

Never saw with the saw guide bar pointing towards the cab. If the saw chain comes loose it is dangerous and may penetrate the window.

In cold weather heat the oil by circulating it through the harvester head, too, at low revolutions and low pressure before starting work.

Drive carefully on hillsides; the harvester may overturn, particularly with the crane on the downhill side.
The forest harvester cab is a safety cab.
The harvester has two exits. The left-side door is the normal exit. The right-hand side window may be used as an emergency exit when the lock has been opened.
Always before getting in the cab, open or ensure from the outside that the lock on the right-side door is unlocked.
When the harvester is in use, the exits must be closed. For safety reasons their construction must not be changed. When driving on frozen rivers or lakes, make sure the ice is strong enough. When driving on ice, keeping doors open helps exiting cabin. In this case beware of thight curves that may cause rear tyre to hit the door
Note the recommended safety distances when harvesting under power lines.
Stop the engine before cleaning or servicing the harvester.
Stop the harvester and the engine immediately if there is an alarm or any abnormal sounds or smells. Find out the reason for them, and solve the problem before carrying on with harvesting.
If there are leaking hydraulic connections, tighten the connections and wipe the oil off the frame and underpan.
Support or lock the crane and the harvester head before going beneath them.
Never clean the harvester without proper equipment.
When leaving the harvester, lower the crane, stop the engine, remove the ignition key, lock the door and turn the master switch to its zero position.

SAFETY DISTANCES WHEN HARVESTING UNDER OPEN-WIRE POWER LINES

The minimum space between the harvester and power lines with voltage must be in accordance with the enclosed illustration, in which the danger zone is darkened.

Low-voltage power lines (230/400V) can be distinguished from high-voltage lines (over 1 kV) by the smaller insulators and the fact that there are usually 4 low-voltage lines. In case the height or voltage of the power line is difficult to estimate, the Electric Company shall be consulted

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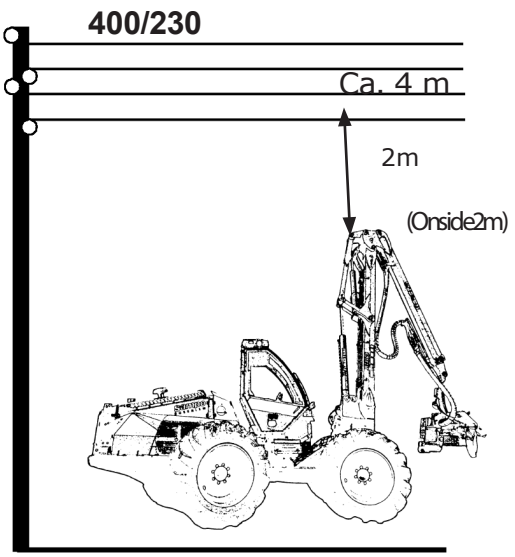
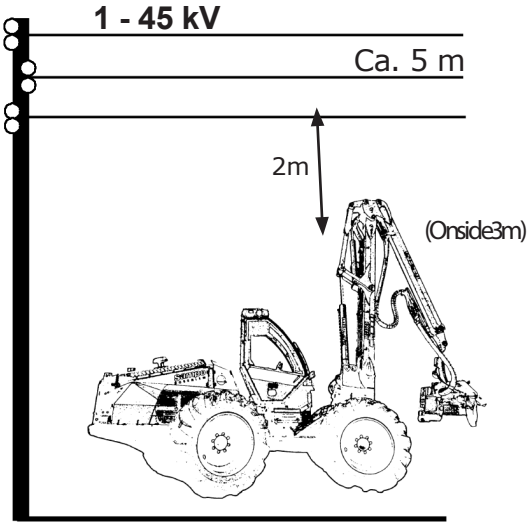
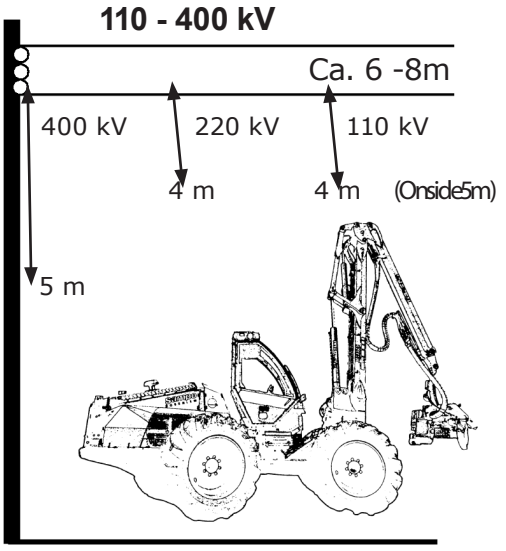






In case of accident

If there is an accident despite all precautions, keep calm and consider carefully what to do. First try to reverse the harvester away from the power line. If there are other people near, ask them to check that the harvester is not stuck in the line. If the harvester is just leaning against the lines, try to drive it away from them. Follow the advice from the people nearby. Due to their own safety, they shall stay a minimum of 20 metres away from the harvester touching the power line.

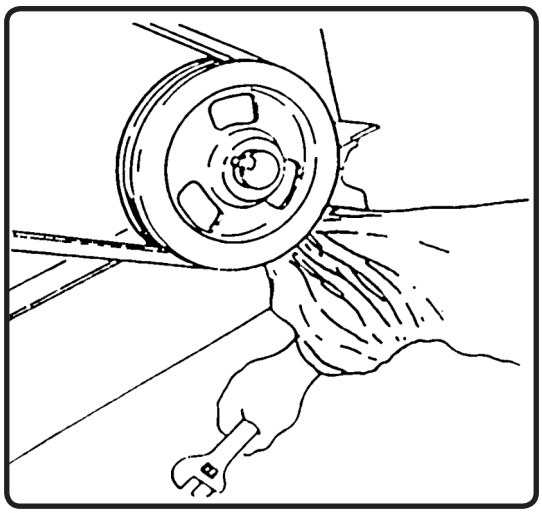
If the harvester cannot be driven off, and you have to leave the machine, jump down with your feet together in order not to touch the harvester and the ground simultaneously. Do not make yourself a conductor through which electricity can pass; the real danger lies in touching the harvester and the ground simultaneously.

Get away from the harvester jumping either with your feet together, or with only one foot on the ground at a time. Otherwise the electric field on the ground may create a fatal electric current between your legs. You will be safe at a distance of 20 metres from the harvester. Beware of broken power lines lying on the ground.

A harvester touching a power line may catch fire. Leave the harvester immediately if smoke starts coming from the tyres.

Make sure the harvester will be guarded at a safe

distance. Do not try to get on the harvester even if the power in the power lines may seem to have gone off.



Remember that open-wire lines never have a ”blown fuse”, but they are always dangerous unless made dead by an electrician. Even if the power went off, it might come back on in a while due to technical reasons. This may be repeated several times.

Contact the Electric Company and inform them about the exact site of the accident. By doing this, any risk can be eliminated and the fault repaired.
Ask the Electric Company for advice and follow it. Inform them about any contact with power lines even if there was no actual damage.

Source: Koneviesti Magazine 15/87

4. Repair and service

Always keep the harvester in good condition. Check the condition of fast moving parts daily. Pay special attention to the transmission mechanism and the rotating parts in the harvester head. Replace defective parts before they become dangerous.
Clean, repair and service the harvester with the transmission and engine off, the ignition key off the ignition switch and main switch off.
The harvester head has many danger points. Read the harvester head manual to familiarize yourself with them. On some models turning of the measuring wheel by hand makes the knives, tracks and rolls close. This is extremely dangerous if the engine is running or there is pressure in the hydraulic accumulator of the harvester head. Do not go near the harvester head, particularly the knives, tracks and rolls, with the engine running.
Before welding, disconnect the battery cables, input cable of the diesel engine control unit (the left hand side cable under the cover of the control unit attached to the engine), all the cables to the PC processor, the cables of the measuring device head module (MCC) and the cab MCI module, connector of the large wiring harness between the frames, the two large connectors positioned on the rear frame that connect the frames and the central unit cables of the optional fire extinguishing system.
Always have the earth cable of the welding set near where welding is done.
Do not use inappropriate tools to connect and disconnect the battery.
Do not make an open fire or smoke near the battery.
Handle the battery acids with care.
Do not add air in the tyres without a pressure gauge due to risk of explosion.
Do not add coolant with the engine running.
Do not remove the radiator cap from an overheated engine.
Beware of hot surfaces of the engine and exhaust pipe.
Do not refuel with the engine running.
Do not smoke while fuelling.
Do not adjust the hydraulic working pressure without a pressure gauge due to possible injury and damage to the components.
When servicing the hydraulics, be aware of the high pressure in the system. Make sure there is no pressure in the system, not in the head pressure accumulator, either, before disconnecting the connectors.
Never use over-sized fuses; they involve risk of accident.
Never start the harvester with anything but the ignition key.
When refitting a wheel, tighten the fixing screws to the correct torque. Switching on the diesel engine is allowed only when the hub is connected to the motor Do not make any such struc-

5. Local laws and regulations

Before driving the harvester on a public road, make sure that harvester is correctly equipped and applies to the local regulations and laws given for such a vehicle.
Machine operator have to be trained to drive and use harvester safely.

This symbol in The manual refers to a special risk involved in taking a certain measure, due to which extra caution shall be practised.

6. Fire safety

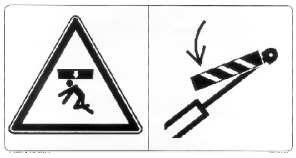
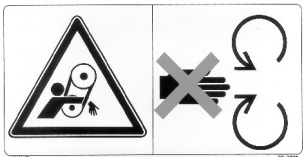
Two factors are needed to start a fire: flammable material and ignition. Oxygen is always available. In the forest highly flammable dust accumulates in and on the harvester. Clean the harvester periodically. Oil and fuel leaks also increase the risk of fire. Repair any detected defects immediately. The engine and the exhaust pipes, the electric system in case of a short circuit and overheated brakes pose a real risk of fire.

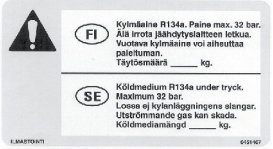
The harvester comes with two 6-kilo hand extinguishers. They are stored above the rear wheel inside the side guard that opens rearwards. The extinguishers shall be inspected every 6 months by an authorized service outlet.
The harvester may be equipped with a semi-automatic fire extinguishing system. Make sure to comply with the manufacturer’s instructions when using the system.

Marking of danger points

Although an effort has been made to build the forest harvester as safe to use as possible, there are certain risks involved in its use. These are to be kept in mind when operating the harvester.
The danger points have been marked on the harvester using danger symbols. On the following page you will find the key to these symbols. The danger symbols are based on the international ISO 11 684 standard.

Danger symbols

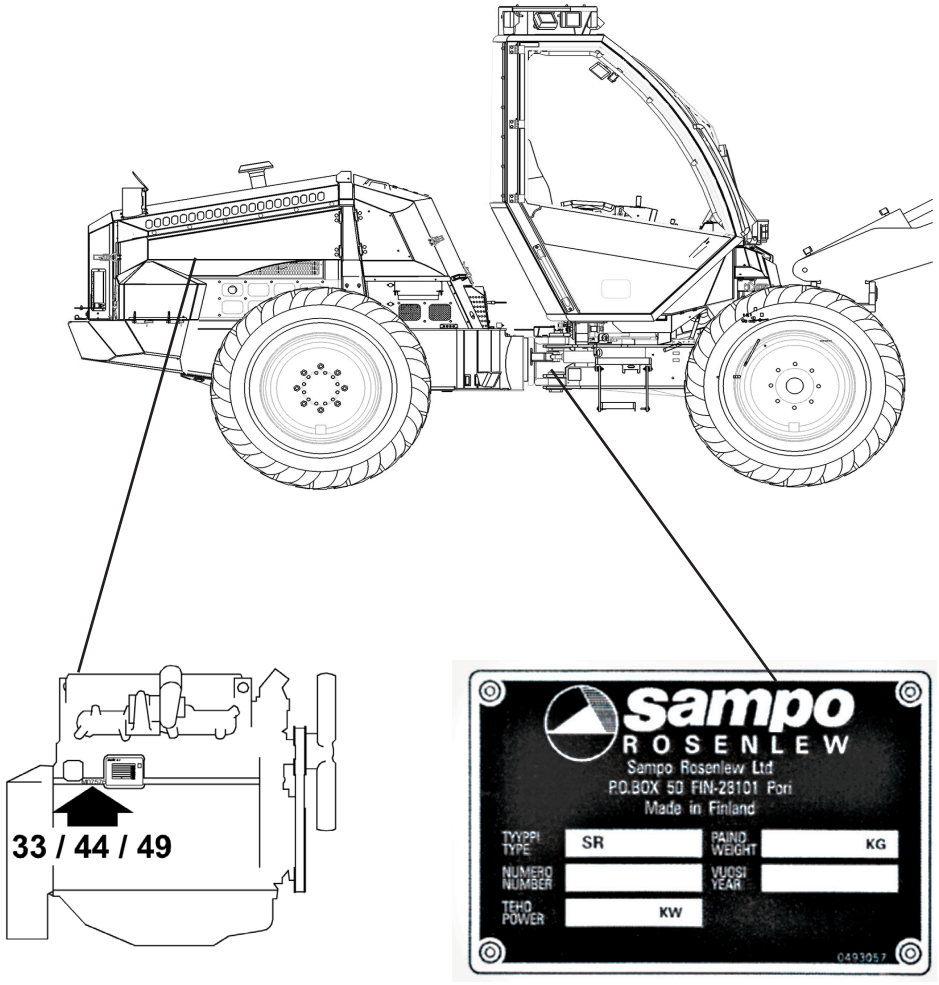
Danger	To avoid danger	Symbol
Subject to danger due to insufficient information	Read the manual before starting the harvester	
A raised part may fall down	Support raised parts before going under them	
Gap in belt drive	Stop the engine and remove the ignition key before removing any guards	
Getting entangled in moving parts	Keep at a safe distance from jointed components	
Falling of the machine or of objects handled with it	Keep at a safe distance from the harvester, the crane, the head and the wood handled	
Electric shock	Keep at a safe distance from power lines. See the safety distances above	

Danger	To avoid danger	Symbol
Fire	In case of fire: - turn off the engine - turn off the main power - extinguish the fire - get help if necessary	
Fire	Extinguish the fire with the fire extinguisher stored under the guard marked with this sticker.	
Service measures	Before starting of service: - turn off the engine - turn off the main power - when servicing the harvester head, remove pressure from the pressure accumulator as instructed	
Safety belt not worn	Always wear a properly adjusted safety belt while working and driving on the road	
Normal exit not available	Open the handle on the right-hand door and exit through the open door Before starting work make sure that emergency exit is unlocked also from the outside.	
Pressurized oil spray	Before disconnecting hydraulic connections, let the presure off the pressurized oil tank by opening the breather filter with a gloved hand while keeping your face far from the breather.	
Refrigerant	Leaking refrigerant may cause frostbite	

Type marking

When ordering spare parts or service, always quote the type marking and number shown on the machine plate. When ordering engine parts, also quote the engine number.

Write down the serial numbers of the forest harvester and engine on this page (and in the spare parts list).



Fill in the serial numbers of the crane and the harvester head

Engine number

Note! Left side of the forest harvester = The side of the cab with the stairs
Right side of the forest harvester = The side with the side instrument panel

Technical specifications

The base forest harvester with articulated steering includes: the cab, gear box, valves, and crane on the front frame, the engine, pumps and tanks on the rear frame.

SR 1046 PRO

Weight	Weight approx. 8000-9500 kg
Maximum permissible weight (ROPS)	10000 kg
Main Dimensions	
Length without crane	4.9 m
Width	2.1 – 32,3 m
Height in transport position	3.03 - 3.10m
Ground clearance	0.6 m
Engine	Agcosisudiesel 44 CTA
- power	84 kW/2,200 rpm
- fuel tank	135 l
Transmission	
Traction hydraulics pump	123 l / min & 420 bar
Front axle drive motor in dividing gear box	45 cc
Rear wheels with hub motors	3150 cc
Two speed ranges forward and backward	1st gear 0-4 km/h / 0-3 km/h 3rd gear 0-19 km/h
Electrically controlled flow divider valve	
At the front hydraulically controlled mechanical differential lock	
Tyres	
Front	500/60-26.5, 540/65R28, 600/55-26.5
Rear	500/60-26.5, 540/65R28
Hydraulic system	
Pump in working hydraulics	220 l/min & 210 bar
Load sensing, programmable electric joystick control (IQAN-Design)	
Oil tank	110 l
Electric system	
Voltage	24 V
Battery	2 x 115 Ah
Charging generator	100 A
Working lights	19
Crane	Kesla H671
Operating range	7,13m
Lifting capacity (gross)	55 kNm
Crane weight	1200 kg
Harvesterhead e.g. Keto 51, 51 Victor, 51 Supreme, 55 Supreme, Kesla RH18, Nisula 400H	3-hose hydraulic system
Max. delimbing diameter	420 mm
Weight	420 – 500 kg
Brakes	
At the front hydraulically & mechanically controlled drum brakes	
At the rear negative multi-disc brakes	
Cab	Quiet safety cab (FOPS, ROPS, OPS)
Noise level	71 dB (A)
Windows	Lexan Margard polycarbonate
Harvesting computer	Motomit IT / PC

Certificate on conformity to the EU directives

CERTIFICATE ON CONFORMITY TO THE EU DIRECTIVES

Manufacturer
Sampo-Rosenlew Ltd
Konepajanranta 2A, P.O.Box 50
28101 Pori Finland

Collector of technical spec:
Jari Karén
Address:
Sampo-Rosenlew Ltd
Konepajanranta 2A, P.O.Box 50
28101 Pori Finland

Description of the machine: Forest harvester SR 1046pro

- complies with the machinery directives (2006/42//EC) and requirements of the national regulations set into force by that.
- complies with the requirements specified in the following machinery directives:

97/68EEC directive on diesel engine exhaust fumes
89/336/EEC directive on electro-magnetic compatibility

The machinery has been designed in conformity with the following international standards:

SFS-EN-ISO 12100	Safety of machinery. Basic concepts, general principles for design.
SFS-EN 14861	Forest machinery Self propelled machinery - Safety requirements
EN-ISO 14982-1998	Electromagnetic compatibility. Test methods and acceptance criteria.

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SAMPO-ROSENLEW OY SAMPO ROSENLEW Ltd

Jali Prihti

Guarantee

Sampo Rosenlew Ltd, later called the Manufacturer, grants a guarantee regarding defects in the material and workmanship.

1. The guarantee period starts as soon as the harvester has been delivered to the customer.

2. The guarantee does not cover:
• freight and postage costs
• transport damage
• damage due to carelessness, misuse or injury
• damage due to impurities in the hydraulic oil or the use of wrong type of oil
• damage due to non-compliance with the operating instructions
• damage due to neglected periodical maintenance procedures
• damage caused by spare parts not approved of by the Manufacturer
• damage due to the natural wear of parts; parts and materials likely to show natural wear, such as :
  - rubber hoses
  - light bulbs, sensors
  - chain and guide bar
  - tyres
  - belts and chains
  - windscreen wipers
  - fuel, oil, coolant and brake fluids
  - filter cartridges
  - packing and gaskets
  - electric cables
  - injection nozzles
  - windows and guards made of polycarbonate
• damage due to measures taken by the purchaser affecting the quality and structure of the harvester. Increasing of the hydraulic working pressure and pressure limits may cause damage;
• indirect damage, such as
  - loss of output or down time
  - compensation claims submitted by a third party
  - overtime and holiday compensations
• damage to property caused by the equipment
• if there is a change in the ownership of the harvester

3. When working in cold conditions, the guarantee is valid only when the outdoor temperature does not drop below -25oC.

4. Any compensation claims under guarantee shall be submitted to the Manufacturer in a complete form within two weeks of the damage.

5. The guarantee compensation is limited, and the Manufacturer shall only replace the defective component unless otherwise agreed with the customer.

6. The components replaced under guarantee are the property of the Manufacturer, and they shall be returned to the Manufacturer upon request. Otherwise they shall be scrapped.

7. The guarantee on components delivered or repaired during the guarantee period will run out at the same time as the guarantee on the harvester.

Structure and functions of the forest harvester

Structure

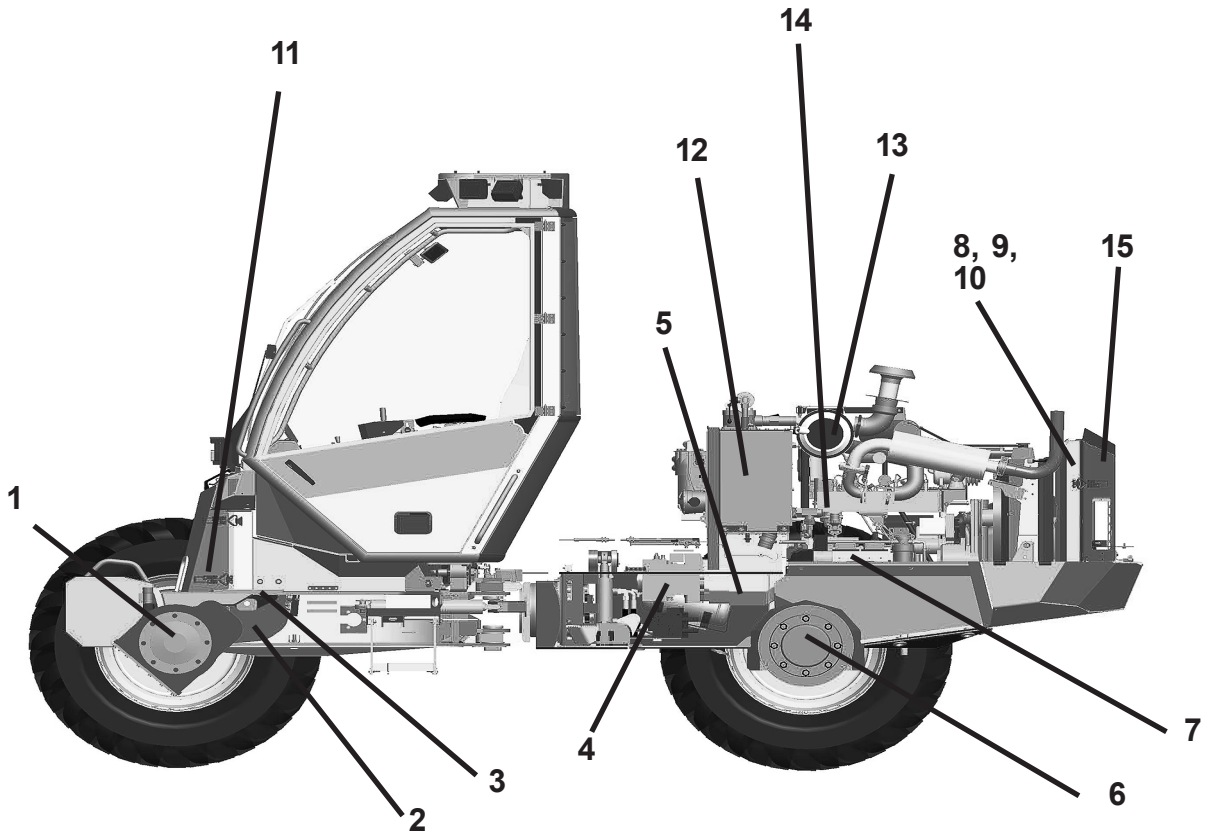
The Sampo 1046PRO forest harvester has been designed to meet the demands set on the first thinning of forest. It is light and easy to handle, small but with a wide operating range. It does not damage standing trees and due to its light weight, it does not cause damage to the roots. With the PRO model, additional attention is paid to the requirements set by continuous professional use.
The forest harvester has articulated steering. The crane, gears and cab are located on the front frame. The engine, hydraulic pumps and oil and fuel tanks are located on the rear frame. The harvester is steered and tilted by means of a joint. The weight of the crane, which is the outermost part of the harvester, is low down. Therefore the whole operating range of the harvester can be utilised and it is easy to get close to the trees. A crane that is near and at a low height does not block the view, and its route is visible even when harvesting from the side. The inner rims of both the front and rear tyres go along the same tracks, which means that the harvester is easy to handle even in dense forest as you only need to keep your eye on the front. The harvester is extremely nimble as the turning angle of the frame joint is 50° and the turning radius only 4.0 m. Depending on the tyres, the width varies between 2.5 – 3.0 m. Although the harvester has been designed to be used in first thinning, it also performs efficiently when clearing larger trees off the driving tracks.

Harvester head

The harvester head cuts and fells the tree. After that the tree is delimbed and cut into a preset length. When harvesting, make sure the engine revolutions are high enough to produce sufficient working pump output to enable the required work movements. Too high working revolutions are heavy on petrol. The Sampo harvester is supplied with alternative harvester heads. The 3-hose system in hydraulics and the CAN route with its easily detachable connectors used in controlling of the head make it easy to change heads. As a harvesting computer is Motomit IT, and when necessary, an on-board computer with a GPS and a data transfer function can be selected.

For further harvesting instructions, check the user manuals for the harvesting computer and the harvester head.

Cut - away picture of the forest harvester

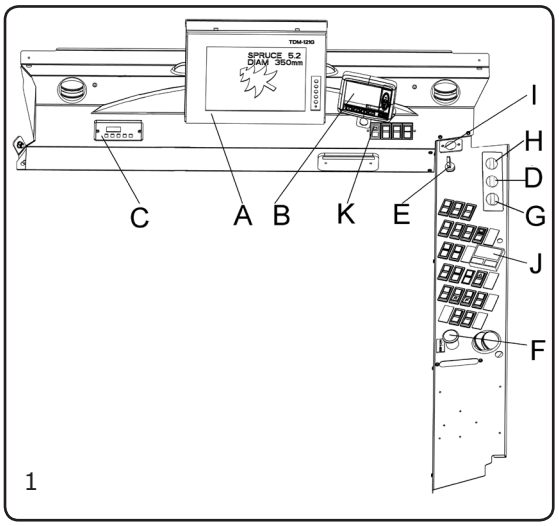


1. Final drive
2. Gearbox
3. Hydraulic motor
4. Traction hydraulics pump
5. Working hydraulics pump
6. Hub motor
7. Fuel tank
8. Radiator
9. Oil cooler
10. Intercooler
11. Hydraulic valve
12. Oil tank
13. Air filter
14. Engine
15. AC condenser

Operator control instruments

Equipment on the instrument panel (fig. 1)

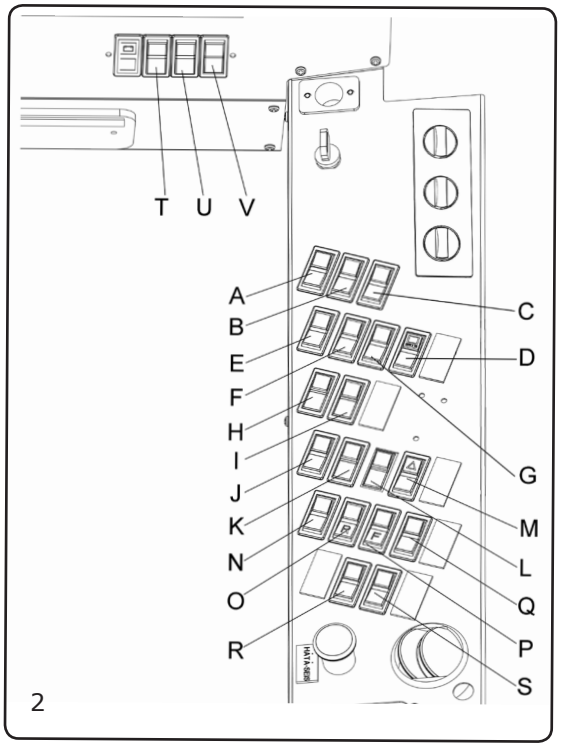
A Harvesting computer display
B IQAN system display
C Engine heater display
D AC regulator
E Ignition, starter (and electric stop)
F Emergency stop
G Heater thermostat
H Fan speed regulator
I Phone outlet
J Measuring device touchpad
K Charge indicator light



1

Switches on the instrument panel (fig. 2)

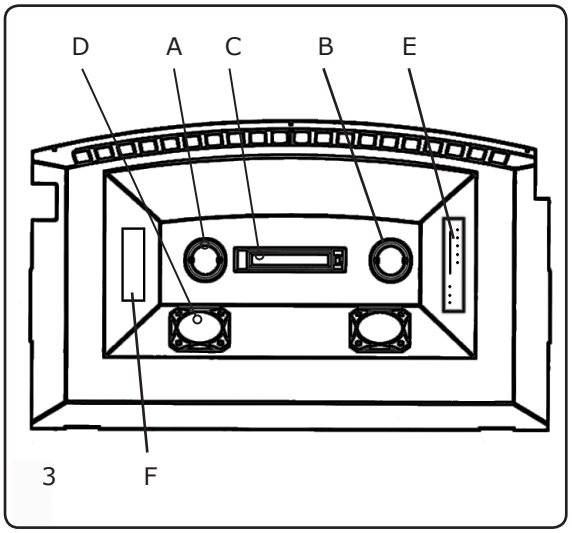
A Throttle
B Frame lock
C Brakes
D PC
E Sound signal
F Windscreen wiper
G Windscreen washer
H Harvesting computer
I Seat heating
J Working lights + delayed light
K Working lights
L Working lights
M Emergency flasher
N 4WD
O Rear lock
P Differential lock front
Q Emergencylight (red)
R Working lights, engine
S Master switch
T Turning signal
U Headlights, dipped
V Headlights, full



2

Equipment on the ceiling (fig. 3)

A) Alarm light (yellow)
B) Fire extinguishing system light (red)
C) Indoor light
D) Speaker
E) Radio
F) PC



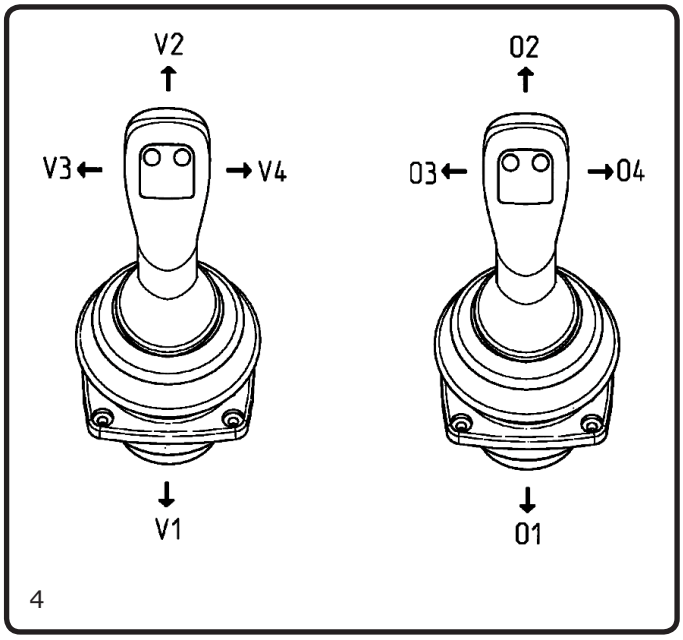
Vertical levers (fig. 4)

Crane control lever, left

V1 Outer boom inwards
V2 Outer boom outwards
V3 Crane turn left
V4 Crane turn right

Crane control lever, right

O1 Crane lift up
O2 Crane lowering down
O3 Frame steering left / rotator turn
O4 Frame steering right / rotator turn



4

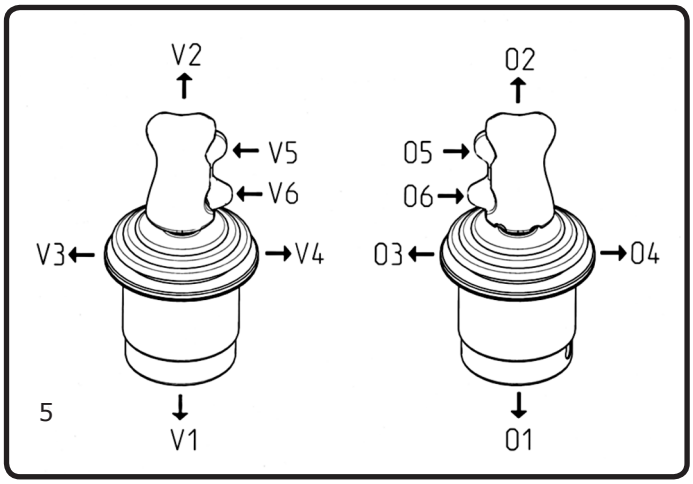
Mini levers (fig.5)

Crane control lever, left

V1 Outer boom inwards
V2 Outer boom outwards
V3 Crane turn left
V4 Crane turn right
V5 Sidetilt left
V6 Sidetilt right

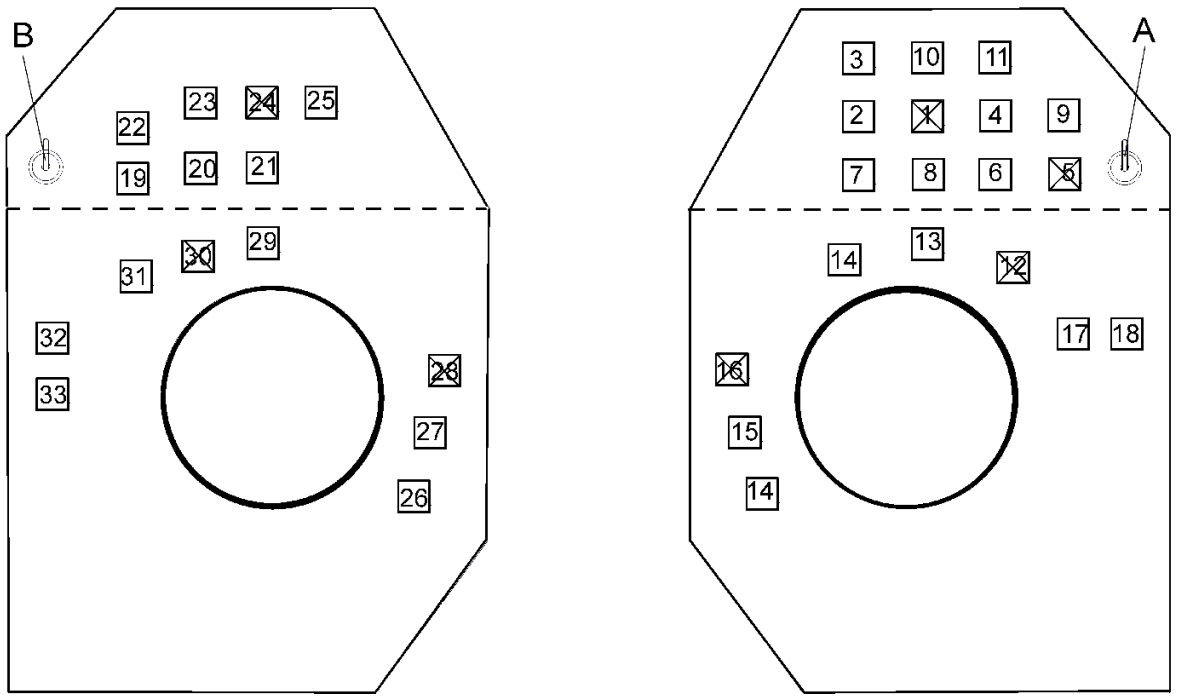
Crane control lever, right

O1 Crane lift up
O2 Crane lowering down
O3 Frame steering left / rotator turn
O4 Frame steering right / rotator turn
O5 Head open / up
O6 Head closed / down



5

Switches on the push button boards on mini joysticks (fig. 6)



6

☒ = Pyramidin muotoinen näppäin
Pyramid shaped button

Left-side push button board

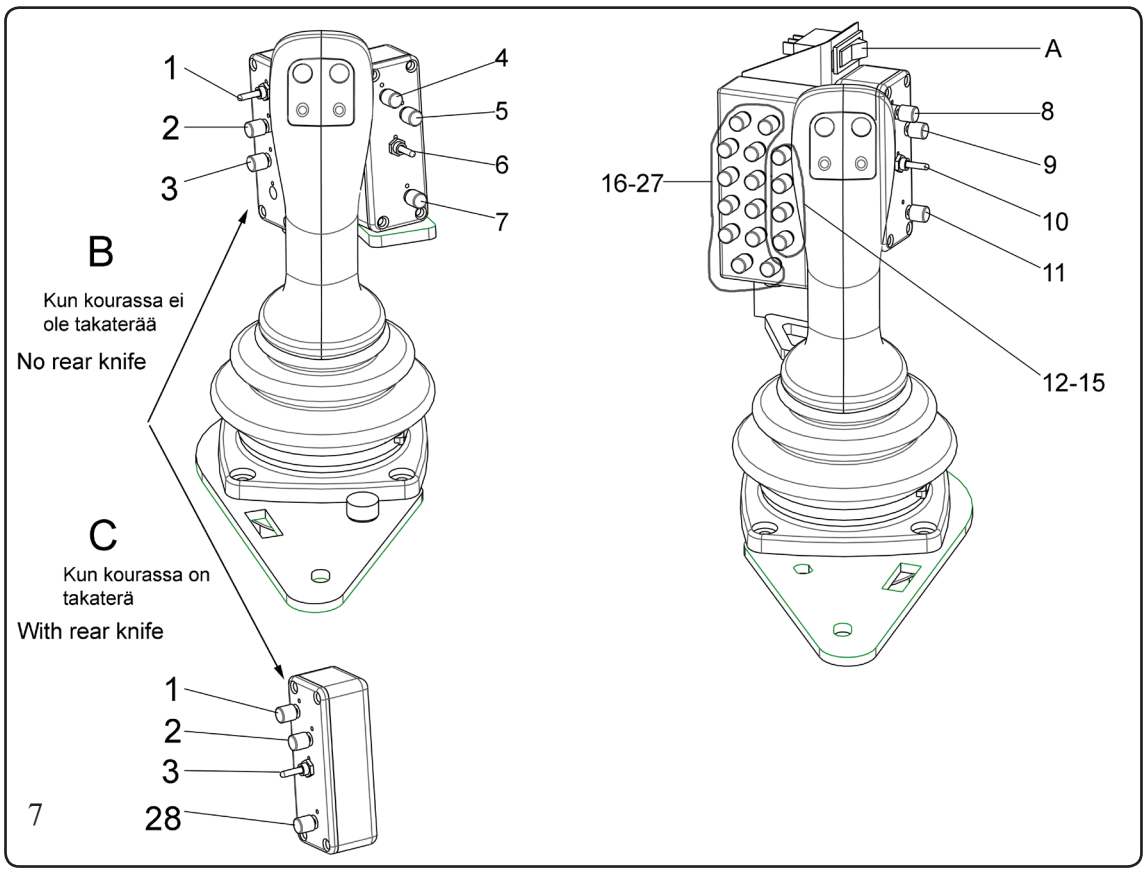
19 Programmable (tree species 1)
20 Programmable (tree species 2)
21 Programmable (color B)
22 Programmable (tree species 3)
23 Programmable (tree species 4)
24 Programmable (color A)
25 Programmable (shift)
26 Rear knife open
27 Tracks / rolls open
28 Front knives / knives open
29 Vacant
30 Tilt up
31 Tilt down
32 Boom side tilt vertical straightening
33 Single wipe
B Driving direction

Right-side push button board

1 Programmable (preset)
2 Programmable (preset)
3 Programmable (preset)
4 Programmable (preset)
5 Programmable (down)
6 Programmable (preset)
7 Programmable (preset)
8 Programmable (preset)
9 Programmable (up)
10 Programmable (preset)
11 Programmable (preset)
12 Slow feed backward
13 Slow feed forward
14 Feed backward
15 Feed forward
16 Saw
17 Programmable (color test)
18 Programmable (urea)
A Drive / harvest toggle switch

Functions displayed on this list are usually programmed in the programmable switches. However, it is possible to tailor the programming for each customer.

Joystick switches on vertical levers (fig. 7)



Vertical lever switches when the harvester head does not have a rear knife B.

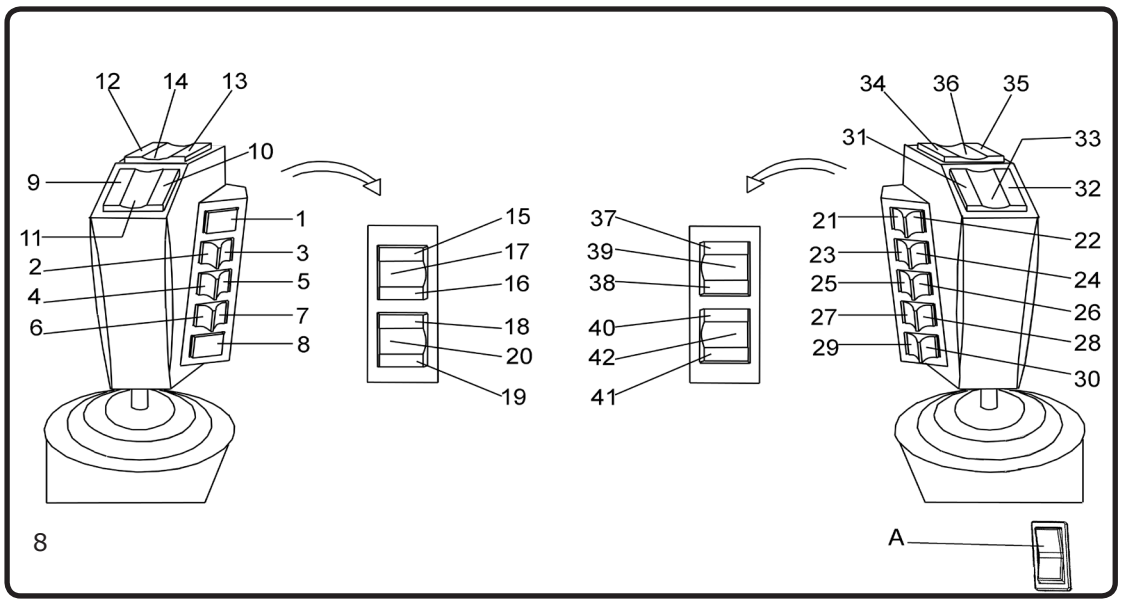
1 Tilt up / down
2 Knives open
3 Tracks / rolls open
4 Slow feed forward
5 Slow feed backward
6 Driving direction
7 Programmable (urea)
8 Fast feed forward
9 Fast feed backward
10 Head open / closed
11 Saw
12-15 Programmable (tree species 1-4)
16-27 Programmable (preset)
A Drive / harvest switch

Vertical lever switches when the harvester head has a rear knife C.

1 Knives open
2 Tracks / rolls open
3 Tilt up / down
28 Rear knives open

Functions displayed on this list are usually programmed in the programmable switches. However, it is possible to tailor the programming for each customer.

Joysticks switches on the EME levers (fig. 8)



1 Saw
2 Programmable (tree species 1)
3 Programmable (tree species 2)
4 Programmable (tree species 3)
5 Programmable (tree species 4)
6 Driving direction backwards
7 Driving direction forward
8 Single wipe
9 Feed backward
10 Feed forward
11 Vacant
12 Slow feed backward
13 Slow feed forward
14 Vacant
15 Tilt up
16 Tilt down
17 Vacant
18 Boom side tilt vertical straightening, or side tilt automation reset
19 Boom side tilt vertical straightening or side tilt automation reset (the same function as above)
20 Vacant
21 Programmable (quality 1)
22 Programmable (quality 2)
26 Programmable (quality 3)
24 Programmable (quality 4)
25 Programmable (quality 5)
26 Programmable (quality 6)
27 Programmable (color test)
28 Programmable (shift)
29 Programmable (new frame)
30 Programmable (reset)
31 Head open
32 Head closed
33 Vacant
34 Knives open
35 Tracks / rolls open
36 Rear knife open
37 Programmable (up)
38 Programmable (down)
39 Programmable (cross-cutting length)
40 Boom side tilt right
41 Boom side tilt left
42 Vacant
A Drive / harvest switch

Signs and symbols

Glow

Suction filter

Return filter

Hydraulic oil temp.

Seat heating

Ignition lock

Oil pressure

Engine revolutions

Sound signal

Working light

Phone

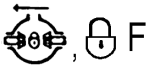
Fan

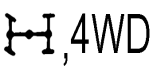
Rotating flasher

Heat alarm for coolant

Headlight, full

Brake

Differential lock, front 

4WD 

Master switch (electric)

Air filter

Alarm symbols appear on the Iqan display, with the exception of the low charging voltage symbol on the front instrument panel.

Hour gauge

Pressure filter

Hydraulic oil level

Fuel

Windscreen washer

Diesel engine stop

Charge

Gear diagram

Gear 1 **1**
Gear 2 **2**

Turning signal

Windscreen wiper

Parking light

Air conditioning

Emergency flasher (red symbol)

Headlights, dipped

Indoor light

Joint lock

Differential lock, rear

Harvesting computer

PC

Emergency exit

Operation and Adjustments

The harvester functions have been divided into two different functioning environments: harvesting in forest and longer-range driving. The difference between these operating environments is in automation. With the harvesting / driving switch (fig 6,7,and 8 switch A) in the harvesting position, the harvester head can always be rotated using the right-side joystick with the drive pedal in its mid position. When depressing the drive pedal, the right-side joystick starts to steer the frame thus enabling a quick and efficient change from harvesting to driving towards the next tree.

Both the brakes and the frame lock can be made to function automatically depending on the drive pedal position. When depressing the frame lock switch (fig 2, switch B) and the working brake switch (fig 2, switch C) in their forward position, the working brakes and the frame lock get always engaged when the drive pedal is in its mid position. Correspondingly when depressing the drive pedal, the working brakes and the frame lock get disengaged. This keeps the harvester stationary and stable during harvesting, but allows nimble moving towards the next tree.

Doorswitch

When the left side door is open, the crane movements, frame steering, drive and head movements are switched off. **Note,** in this case steering does not work and some models of harvesting heads may move back to the resting position, in other words close.

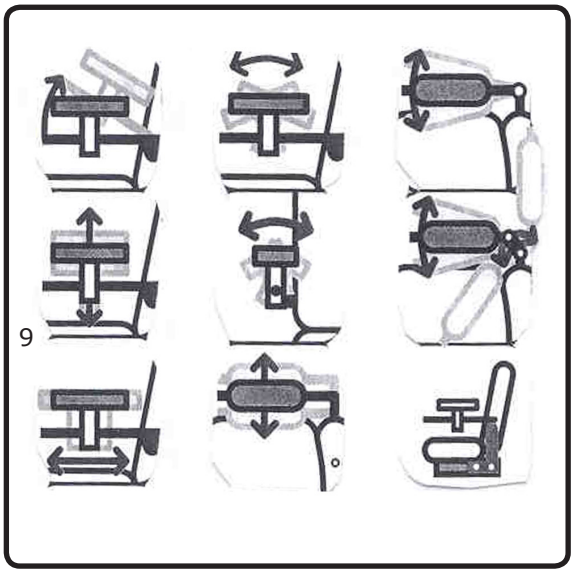
After disconnection by the door switch harvester head is reset back to functional status as follows:

· Press ENTER from the Harvesting computer
· Select the service menu, and then press ENTER
· Click Reset, and then press ENTER
· Select the switch on harvester head current menu and then press ENTER
· Close the head, and then press ENTER
· Press the ESC button twice

The printer of the harvesting computer has its own power switch. Turn it on when you want to print.

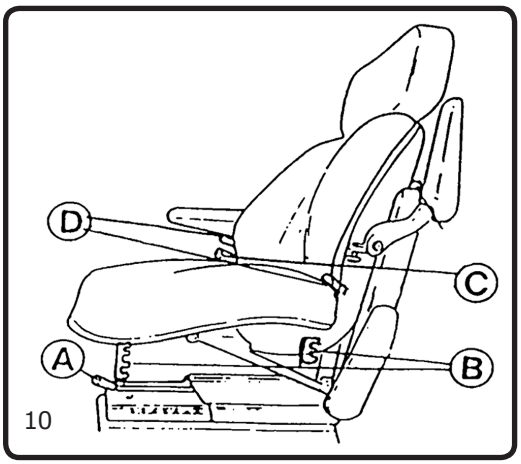
Joystick positions can be adjusted (fig. 9)

The positions of the crane joysticks and seat armrests can be adjusted at several points. To facilitate entering and leaving the cab, the joystick near the door can be turned both up/down and sideways. After adjustment it is important to lock the positions of the joystick and the armrest to prevent unwanted movements.


9

Seat has several adjustments (fig. 10)

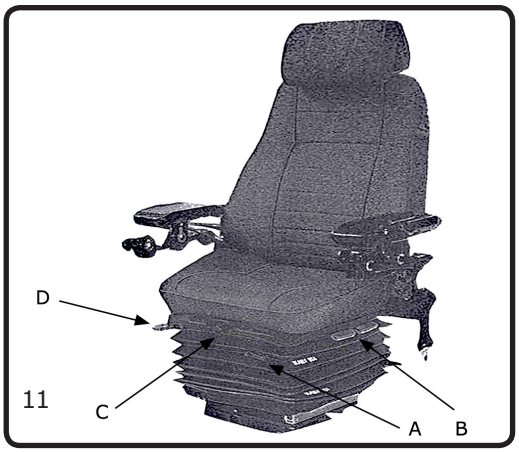
1. To adjust the fore and aft position of the seat, lift lever A and move the seat in the required direction.
2. Adjust the height using forks B at the front and back of the seat.
3. Adjust the suspension using lever C.
4. Adjust the backrest angle using lever D.



10

Air suspended seat has more adjustments (fig. 11)

1. To adjust the fore and aft position, unlock lever A and move the seat in the required direction.
2. Adjust the height and fore/aft tilt by pressing levers B on the side of the seat and lifting/depressing the front or rear of the seat.
3. Adjust the seat suspension pneumatically by pressing button C.
4. Adjust the backrest angle using lever D.
5. If the seat has side tilt, it can be tilted using the regulator unit on the armrest.



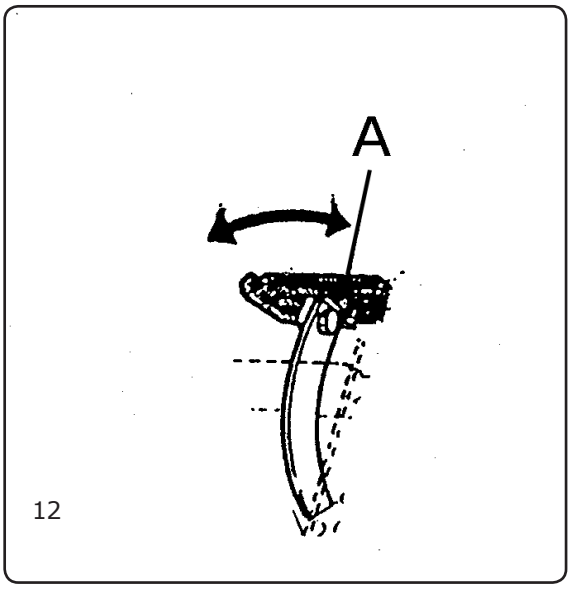
11

Brakes while driving and harvesting (fig. 12)

The harvester has negative hydraulic brakes. Braking power is generated by springs, and the brakes are released using hydraulics. Mechanical outer shoe brakes operate on the front wheels through the drive shafts. With the gear engaged, the hydrostatic drive transmission always brakes itself when the drive pedal goes toward its mid-position.

The brakes are mainly controlled from the cab using a triple-position switch (fig. 2, switch C). Using the triple-position brake switch, the brakes can be engaged, disengaged and put in their automatic position hydraulically. In their mid-position the brakes are always engaged, and when depressed all the way back they are always disengaged. In their forward position, that is the automatic position, the brakes operate depending on the position of the drive pedal. When harvesting or driving on hilly roads, the brake switch should be in its automatic position.

In the cab there is also brake pedal A, which can be depressed to generate braking power on the brake shoes comparable to pedal power. Depressing the brake pedal does not generate as much braking power as hydraulic spring brakes. The brake pedal is mainly intended for use on the road if the braking power in hydrostatic transmission is not enough.



12

Parking brake

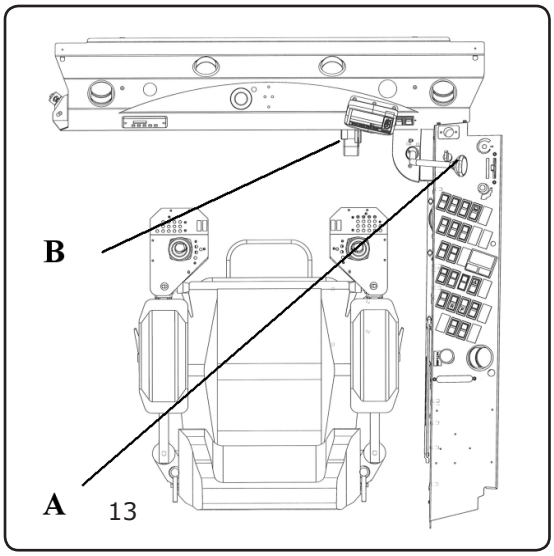
The parking brake gets engaged automatically when the engine is switched off.

Frame lock

The frame lock operates similarly to the brakes. Depending on the position of the frame lock switch, the dual-function cylinders either locks the frames together, allows them to turn independent of each other or operates in the automatic position at the same time with the brakes. With the frame lock switch (fig. 2, switch B) in its mid-position, the frame lock is always engaged and when depressed backward, the frame lock is disengaged. Normally when harvesting, the frame lock switch should be in its automatic, that is in its forward position.

Traction transmission

Engine power is transmitted to the consecutive work and drive pumps by means of a flexi switch. From the pump to the hydraulic motor of the gear box the power is transmitted by means of liquid. The pump output is adjusted steplessly using the drive pedal between positions 0 and +/- maximum.
There are three gear speed ranges, which are selected using lever A, fig. 13. The ranges are intended for harvesting (range 1 with the gear lever down pulled backward), driving in the forest (range 2 with the gear lever up pushed forward), and driving on the road (range 3 with the gear lever down pushed forward). Gears should be shifted on level ground without pressing drive pedal B. From the gearbox power is transmitted to the front wheels by means of the drive shafts and the final drives.



13

The speed of the harvester is controlled by drive pedal B. When the pedal is not pressed, the harvester is stationary if the gear is engaged and the engine running.
Driving direction (forward/backward) is chosen by switch close to left joystick (switch A, picture 13a). Drive direction forward is selected by pushing switch forward. Correspondingly drive direction backwards is selected by pushing switch backwards. Speed is controlled by pedal. Also the engine speed (r/min) and potentiometer B (fig 13a) near left joystick affect the speed.
When driving in traffic, the harvester head should be kept close to the harvester and tied. The harvesting computer should be switched off in case of unintended crane movements.

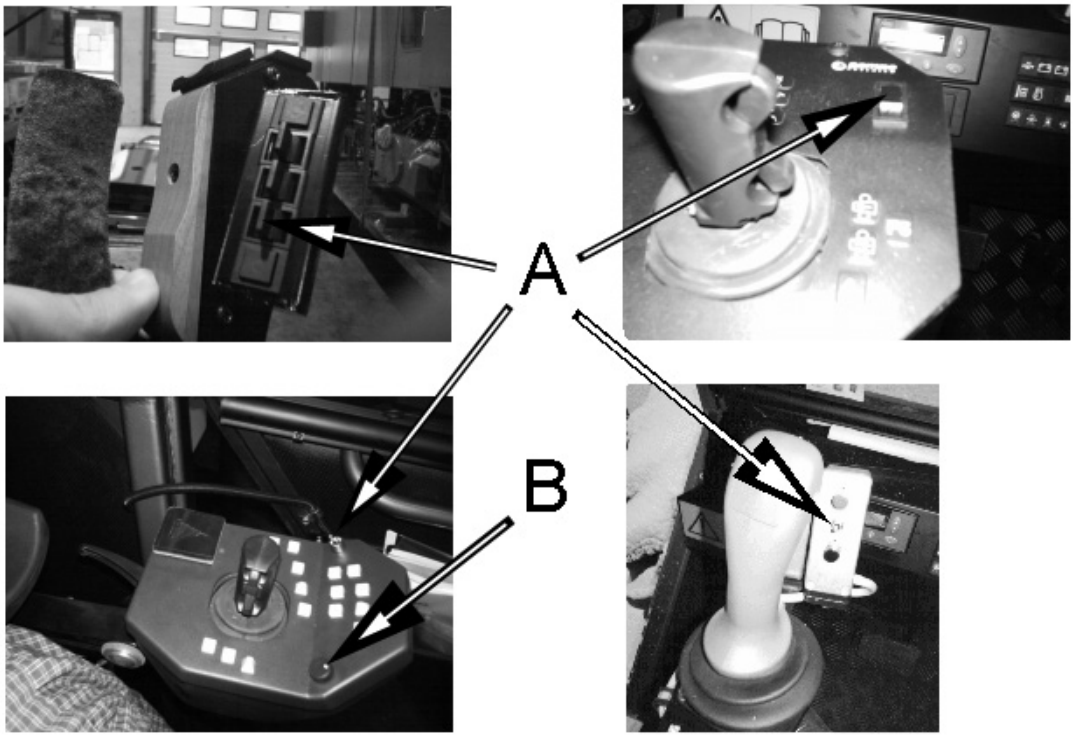
A forest harvester equipped with hydrostatic transmission must never be parked using only the gear, but the parking brake must always be engaged. The hydraulic motor cannot keep the harvester stationary for a long period.

Four wheel drive

Rear-wheel drive is switched on electrically using switch N on the right-side instrument panel, fig. 2. The coupling shall be done with the harvester stationary. 4WD is available on gears 1 and 2. When towing the harvester, four-wheel drive must be off and the engine running to allow the wheel motors to be disengaged. Short-distance towing at a low speed is permitted if the engine and the drive pump cannot be kept running.

Differential and rear- wheel drive lock

There are often situations when both the wheels on the front or rear axle do not have sufficient grip in respect to the required traction power. In this case one of the wheels stops gripping, which will further decrease the traction power. This can be avoided by engaging either the front lock using switch P (fig. 2) and/or the 4WD lock using switch O, (fig. 2). The engagement of the 4WD lock generates anti-skid between the front and the rear. This also engages the hydraulic lock between the rear wheels. The 4WD lock does not hold 100 %. Thus it allows different wheels to turn at a different speed. On solid ground the 4WD lock makes turning difficult, so it should be switched off. The mechanical differential lock at the front should also be disengaged before sharp turns. The front mechanical lock can be switched on when the machine is stopped and it can be used on gears 1 and 2. The four wheel drive lock is only available on gear 1.



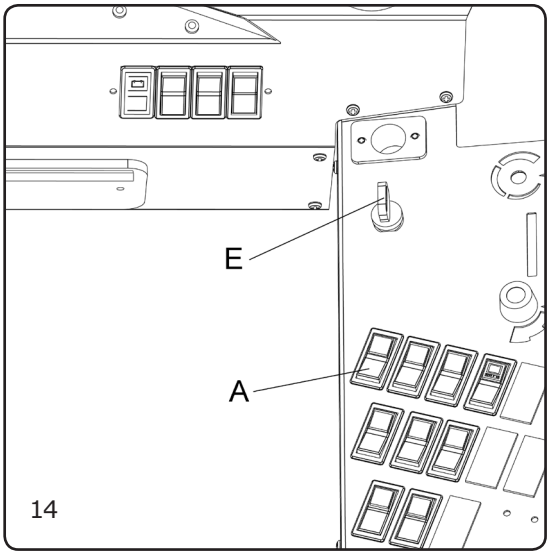
13a

Starting of the engine (Fig. 14)

The forest harvester is equipped with a safety ignition system, which prevents the harvester from moving with the engine being started. It allows the start-up to take place only when the drive pedal is not pressed.

The engine is started using the ignition key E. Turn the key to the right to switch on the ignition. The same position also operates the engine glow. During the glow, the engine will not start, and this is also displayed on the Iqan display. When turning the ignition key farther to the right, to position HS, the engine starts.

With the throttle A in its rear position , the engine runs at idle. In the center position, the working revolutions are used. When pressed forward, the diesel engine uses full revolutions. Have the engine always idle before switching the diesel off and on. The instructions on adjusting the revolutions are available in the section Using the Iqan display.

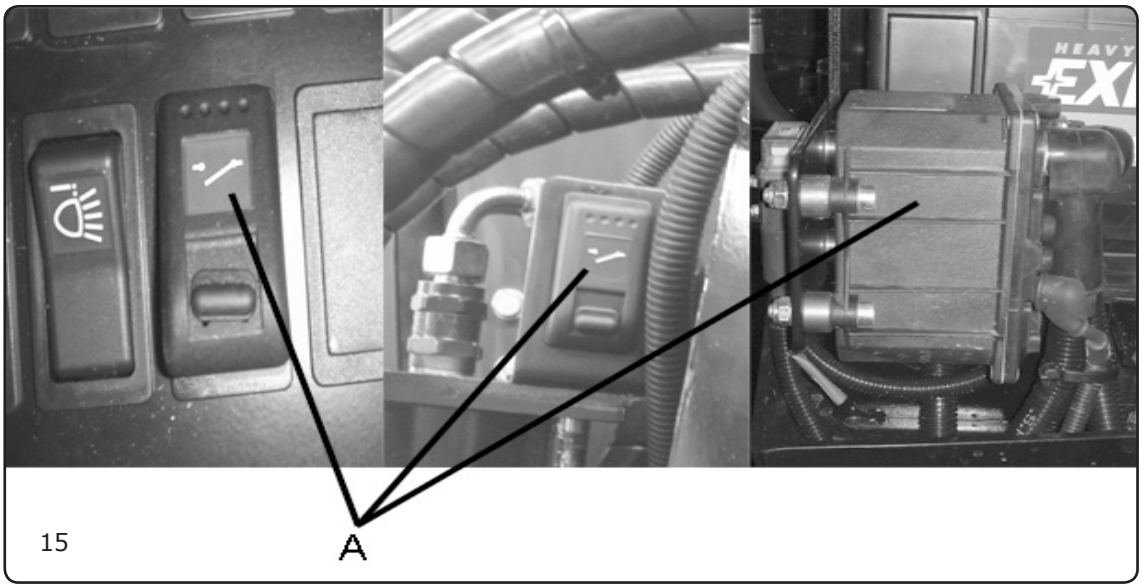


14

Stopping of the engine

Before stopping of the engine, move the throttle into the idling position. The engine is stopped using the electric stopper by turning the ignition key to position 0.
Beware of the movements of the harvester head when you switch off the diesel engine. When the power is switched off, the harvester head controls switch off as well and the head may return to its resting position from certain functions. These kinds of functions include, for example, Head closed and Tilt down, depending on the type of the head. The harvester heads often also contain pressurized batteries, potentially causing there to be enough power left for head movements even after the power has been switched off. When finishing working it is recommended to turn off harvesting computer and PC. In this case there is no danger that even accidental use of harvesting head would cause unwanted movements in restarting.

When you turn the ignition key to the left of the 0 position and press it simultaneously down, the vacuum pump of the oil tank switches on automatically. This is a way to protect the environment and reduce oil waste in cases of hose breaks. The vacuum also should be used when servicing the hydraulic system. Do not try to run the machine while the vacuum pump is on since a vacuum causes cavitation and quickly damages the hydraulic pumps.



15

Main power switch (Fig. 15) Controls Electricity for the Whole Forest Harvester

There is an electric main power switch to control the electrical instruments of the harvester. It is located on the left-hand side, behind the rear wheel inside a closed box. There are two power switches. One is inside the cabin on the side instrument panel, and the other one inside the aforementioned closed box.

When you leave the cab for an extended period of time, always switch the power off from the main switch as well. Just turning the ignition key to the 0 position leaves several electrical equipment on, including the fan motor. This uses enough power to potentially cause the battery to empty while you are away.

Emergency stop

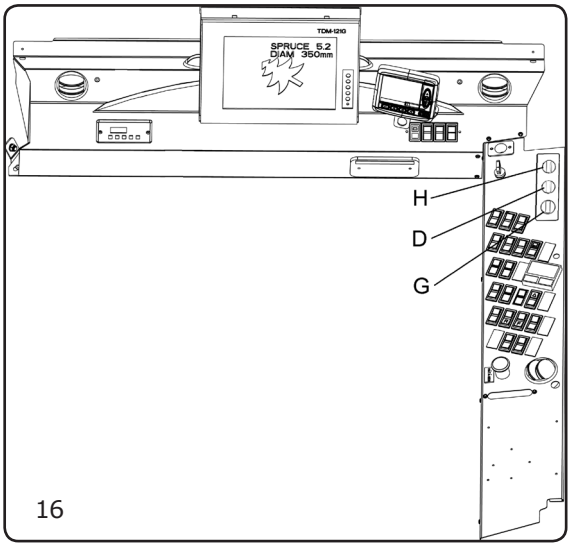
When the emergency stop switch (fig. 1, switch F) is depressed all the way, the diesel engine gets switched off, but there is still current in the electrical system, but the power to the joysticks, the crane control module and harvester head module switches off. This engages the brakes. When the engine is switched off, the harvester cannot be steered.

Working lights

You can select the number of the working lights that are on using the working light switches on the instrument panel (figure 2, switches J, K and L). For the working lights controlled by switch J, it is possible to use a so-called delayed light function by leaving these lights on before turning the main power switch off. Some of the harvester's working lights remain on to light the surroundings while you leave the harvester. The lights switch off on their own in about 90 seconds. The switch R (figure 2) controls the working light inside the engine compartment. It should only be used during service operations.

Cab Fresh-air fan Provides Good Ventilation

The 4-speed fan is started using switch H (fig. 16). To change the airflow direction, turn the nozzles on the panels. The fan air is filtered in from the left-hand rear bottom corner of the cab. The outer-most filter is of a coarse mesh type, and the inner one is the actual fresh air filter.
To keep up the fan capacity and secure the purity of the air, the filters shall be cleaned or replaced often enough to prevent impurities and fungi from clogging the filters. In dusty conditions it is necessary to clean the coarse mesh filter several times a day.



16

Heater Provides Additional Heat from the Engine

The air in the cab is heated by a heating element in which the engine coolant circulates. Turn switch G to the right to increase the amount of coolant circulating in the element. This will increase the temperature in the cab.

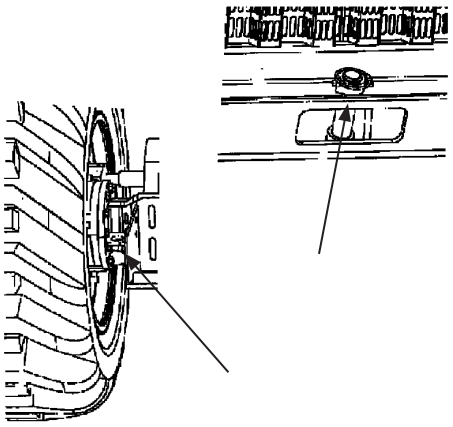
Air conditioner cools the Air in the Cab

The cab can be equipped with air conditioning system.
Turn switch D fig. 16, to the right to switch on and regulate the air conditioner.

Note! A difference of over 8°C between indoor and outdoor temperature is harmful to your health.
Keep the cab door closed when the air-conditioning is on. Keep the heater regulator lever in its cold position, i.e. the heater water circulation off.

Towing (fig. 17) Allowed from Towing Points Only

The harvester may be towed from designated points only. When towing backward, the towline is put around the pin as shown in fig. 17. When towing forward, there are holes as shown in fig. 17 near the reduction gear. With the harvester on tow, the operator must be in the cab and the engine running to enable steering. Four-wheel drive must be off.



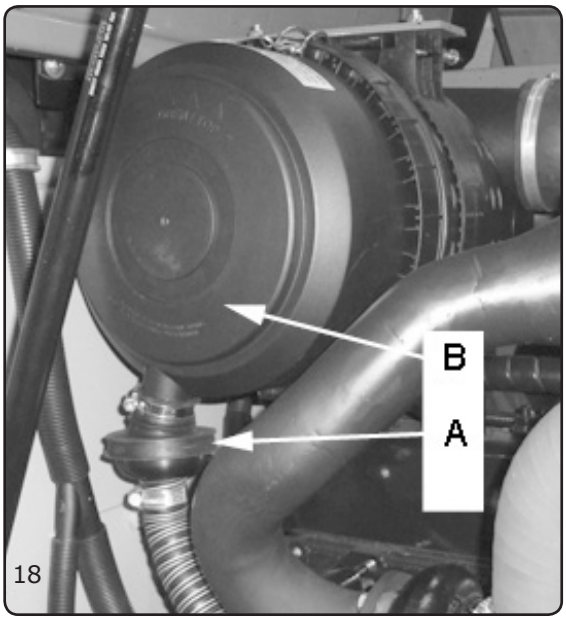
17

Unless the engine can be started, the harvester must be towed with great care; as steering is not working. In this case, the brakes should also be released mechanically

When towing on the road, statutory traffic regulations must be followed.

Engine, source of power

The engine is a water-cooled, four-stroke Common rail diesel. For a more detailed description of the engine, see the engine manual.
Power is transmitted from the rear of the engine to the working hydraulics and traction transmission pumps. The front of the engine houses belt drives for the fan and the alternator generators and the AC compressor.

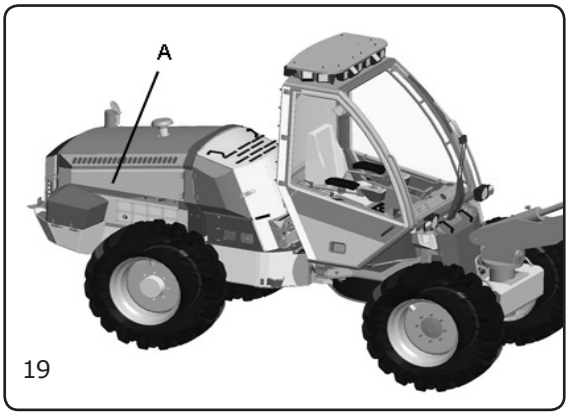


18

Suction air filter (fig. 18)

The engine suction air is cleaned by prefilter and two-part paper filter B. A warning text and symbol in the Iqan display indicate a blockage in the filtering system. See cleaning instructions under service and maintenance. The prefilter A is inside the filter cartridge and it is continually drained by means of an exhaust fume ejector.

Fill the tank with fuel free from impurities (fig. 19)



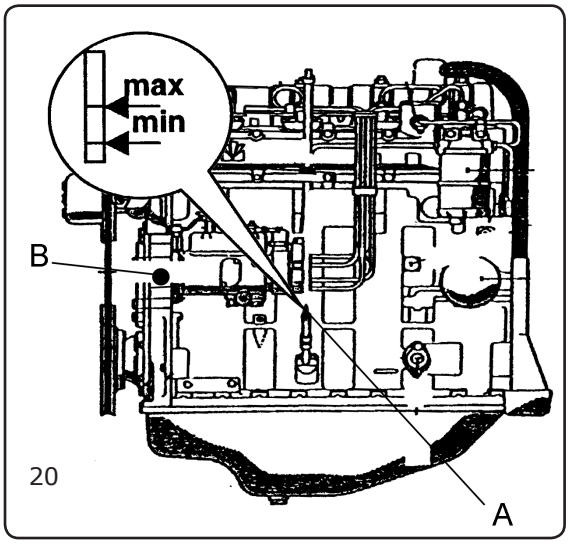
19

The volume of the fuel tank is 135 litres. Use high-quality diesel oil as fuel. Check the fuel requirements in the engine manual. The fuel must be free from any impurities and water. Before refuelling, remove all impurities from around filler A. Never drain a spare tank into the fuel tank, as impurities and water tend to settle on the bottom. If fuel is added from a spare tank, a funnel with a sieve must be used.

There are air bleeds on the outer rim of the filler through which air gets into the tank. Make sure these bleeds stay unblocked. Never use a filler without air bleeds. cooler course mesh filter there is a small-holed screen. To clean it, first turn the rear cog to its down position and then lift up the screen.

Daily Checks of the Engine (Fig. 20) Lubrication System

It is of utmost importance to use correct lubricating oil types, in accordance with the load placed on the engine. See Lubrication Table under ”Maintenance”. Check the oil level daily before starting; it shall be between the minimum and maximum marks on dipstick A, preferably near the maximum, fig. 20. Oil is refilled through filler B. Symbol on the iqan monitor indicates low oil pressure. Should the oil pressure warning light come on with the engine running, stop the engine immediately and find the cause for the trouble.



20

Cooling System

The engine cooling system is filled with coolant that has 40-50 % ethylene glycol in it. Do not use plain water as coolant as it damages the engine. Before refill, the engine must cool off. When refilling, remember the coolant expands considerably when it gets warm, so do not fill up the system. The coolant level is correct when the cells are clearly covered by the coolant, and the coolant level can be seen at the bottom of the level indicator hose of the expansion tank. Check the coolant level daily before starting.
The coolant temperature can be seen on the iqan monitor. It shall be between 75-95oC. A warning symbol on the iqan monitor indicates engine overheating when the temperature reaches 95oC. If the temperature starts to rise, check that the outside of the radiator is not clogged. The best way to clear blockage is to direct compressed air from the side of the fan through the radiator, or use a brush for cleaning. Always be careful not to damage the lamellas. Behind the cooler course mesh filter there is a small-holed screen. To clean it, first turn the rear cog to its down position and then lift up the screen.

Crane side tilt automation

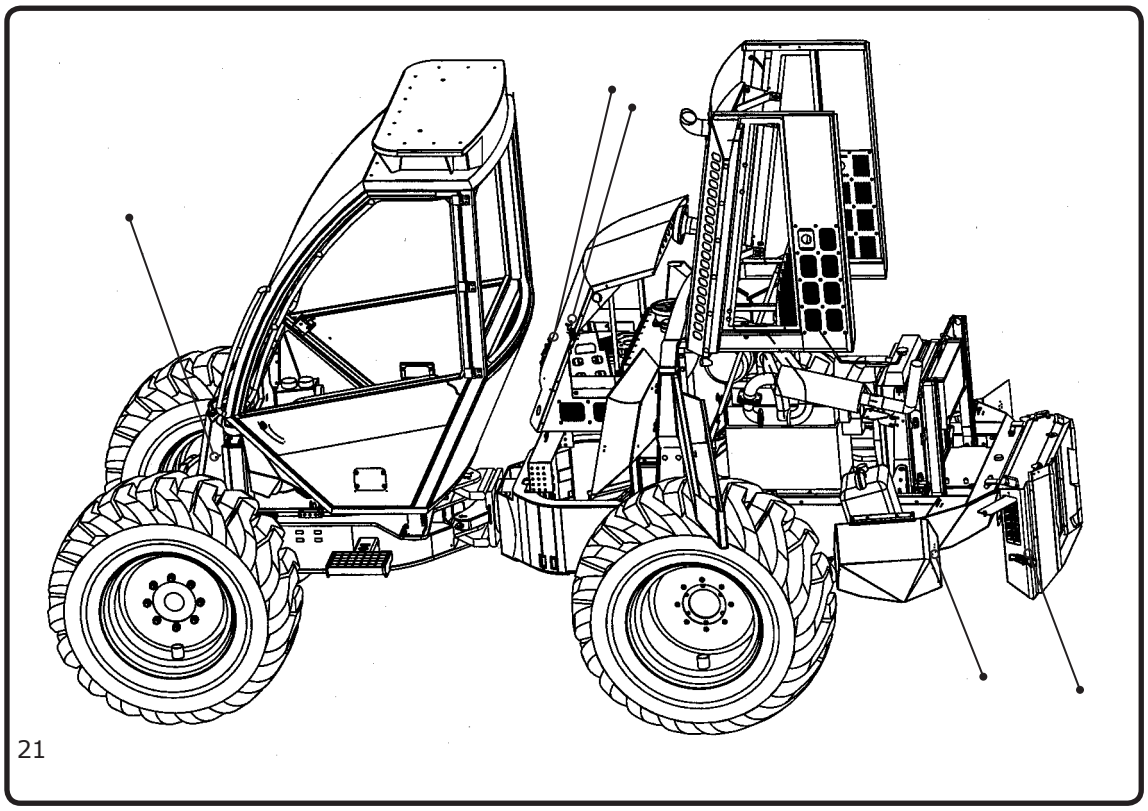
An automatic stabilizer function is available for the crane side tilt as an optional feature. It helps keep the crane in an upright position even if the machine itself is tilted sideways on a slope. This automatic function can be switched on from the side instrument panel. If the side tilt is used manually, the automatic stabilizer function is disengaged. The automatic stabilizer can be re-engaged by pressing the side tilt vertical straightening button on the joysticks. The same button must also be pressed after starting the diesel engine. This is to avoid accidental movements that the driver may not notice.

Fire extinguishers

The harvester is supplied with two portable 6-kg fire extinguishers. They are located above the rear wheel inside a side guard that opens backwards. The extinguishers shall be checked every six months by an authorised service outlet.
The harvester may also be equipped with a semi-automatic fire extinguishing system, which shall be operated in compliance with the Manufacturer´s instructions.

Opening of the guards

The movable guards of the forest harvester are equipped with quick-release locks. The guards can be locked placing an ordinary padlock in the hole for the quick-release lock.

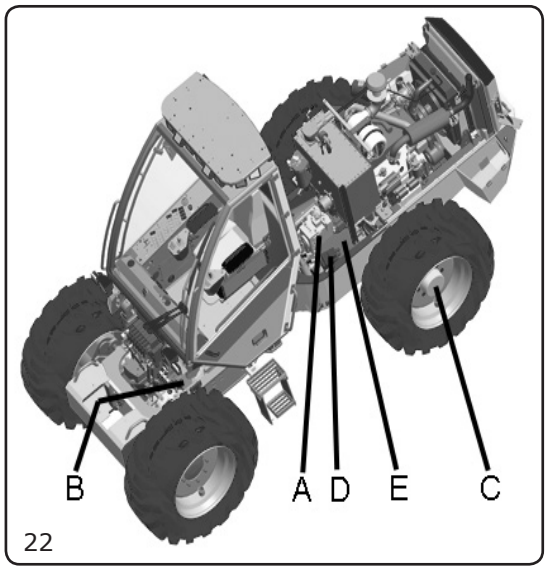


21

Hydraulics

Hydraulics is divided in traction and working hydraulics. They have a joint oil tank on the rear frame of the harvester.
Traction hydraulics (fig. 22) includes a suction filter, drive pump, distributor valve, five directional valves, a hydraulic motor at the front and hub motors at the rear.
The drive pump produces pressure corresponding to the drive resistance and a volume flow corresponding to the drive pedal position. When using four-wheel drive forward, the oil flows into the distributor valve. The distributor valve distributes the volume flow between the front and the rear. From the distributor valve the oil flows to the hydraulic motor at the front and from there onwards to the pump. The oil flows from the distributor valve to the rear hub motors through the directional valves. The flow from the rear motors goes though the joint return directional valve back to the drive pump. When using front-wheel drive, the directional valves close off the connection to the distributor valve and the drive pump. At the same time they engage the rear hub motors in neutral.

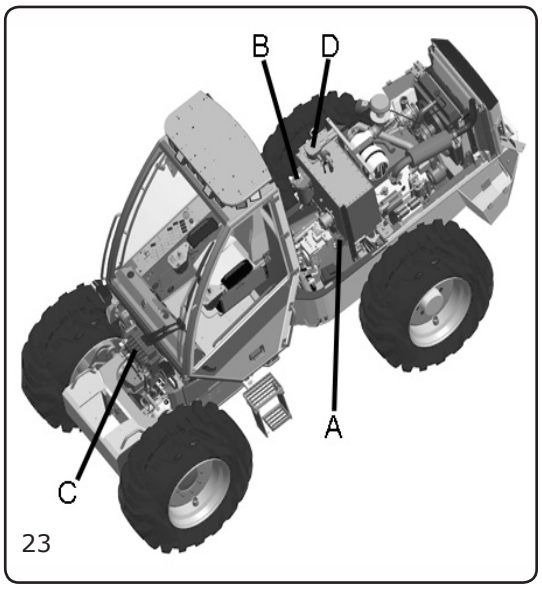
A Drive pump
B Front hydraulic motor
C Hub motors
D Distributor valve
E Directional valves



22

Working hydraulics in the basic harvester (fig. 23) includes a work pump, pressure filter, load sensing directional valve and return filter. Crane movements are controlled by a load-sensing valve. The work pump produces the right pressure and output in relation to the load weight and speed. This enables fast and precise movements in every circumstance.

A Work pump
B Pressure filter
C Directional valve
D Return filter



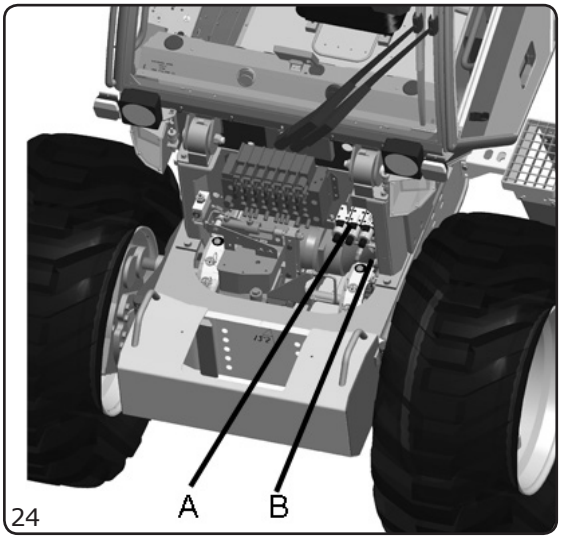
23

Individual work pump pressures are set for the harvester head functions from the measuring device. In addition, depending on the head it is possible to set compression pressures based on the type of tree being handled for knives and tracks/rolls, for example.

It is forbidden to change the pressure in working and traction hydraulics without permission from the Manufacturer, as it may damage the harvester and cause risk of injury to the mechanic and the harvester operator.

The operations of the brakes and the front differential lock (fig. 24) are controlled by directional valves. The cylinder in the differential lock is dual-functioning and when disengaged, the pressure is on the side of the cylinder shaft. When engaged, the pressure is directed to the side of the cylinder piston. The brake cylinders get disengaged when the pressure is directed to the side of the cylinder shaft. The piston sides are connected to the tank line. The brakes and the front lock derive their driving force from the pump in working hydraulics by means of a pressure reducing valve.

A directional valves
B cylinders



24

The frame lock is equipped with a dual-function cylinder. The cylinder derives its load from the return flow. When the frame lock is engaged, the directional valve closes the flow routes and the cylinder becomes locked in its place.

The basic harvester is equipped with a separate cooler for the hydraulic oil. The cooler includes a pump and condenser. The pump receives oil from the tank as well as from leaks in the working hydraulics pump and the harvester head, and its pumped through the condenser and the return filter back to the tank.

When dealing with hydraulics, uncompromising cleanliness is of utmost importance. The oils used shall comply with the Manufacturer´s instructions. Refill shall always be done through the return filter.

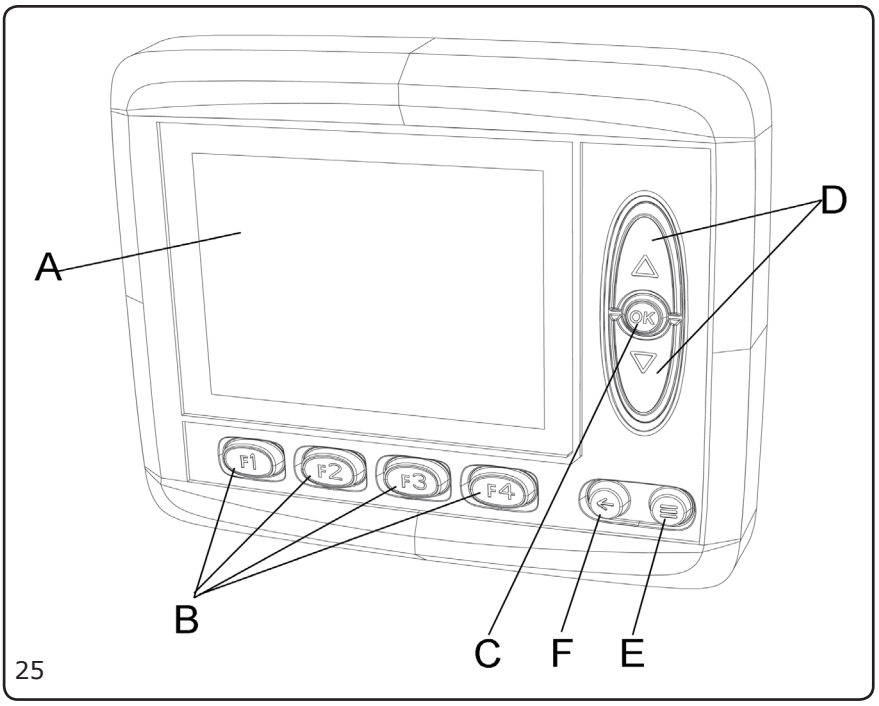
Electricity

Fuses
The fuses F1-F54 are located on the circuit board below the side instrument panel. The fuses F55-F60 are located in the trailer next to the starting motor.

F1	15A	+12 V outlet cab
F2	7.5A	Radio, delayed light control
F3	5A	PC +12 V
F4	5A	Modem +12 V
F5	5A	Printer +12 V (meassure shears)
F6	5A	Radio memory
F7	15A	Engine heater
F8	20A	Working lights (delayed lights)
F9	10A	Water pump of an additional heater
F10	5A	Engine heater clock MD3 RTC and the eber remote control
F11	7.5A	Heater fan
F12	7.5A	+Bat measuring device
F13	20A	Working lights
F14	20A	Working lights
F15	25A	Starting engine solenoid
F16	20A	Air conditioning
F17	20A	Working light, additional tree top
F18	20A	Working lights
F19	20A	Working lights
F20	20A	Working lights
F21	20A	Working lights, additional tree tops
F22	20A	Measuring device
F23	10A	Emergency flashers
F24	10A	Fire extinguishing
F25	15A	Rotating flasher
F26	3A	Handles
F27	5A	PC monitor heating
F28	10A	Sound signal
F29	20A	PC and voltage reducer
F30	3A	Cab indoor light and electri cal equipment light
F31	10A	Working light engine compartment
F32	10A	Solenoid valves, four wheel drive, front wheel drive
F33	3A	XA2, Iqan joystics, generator D+, CTA ignition
F34	5A	Turn signal relay
F35	15A	Windscreen wiper, washer and switch signal lights
F36	5A	Greasing system
F37	3A	Measuring cutters loading
F38	7.5A	Drive pump angle sensor, controls four wheel drive, front lock, rear lock, joint lock
F39	3A	MD3 display
F40	10A	Vacuum pump
F41	5A	AC compressor
F42	3A	Turning signal left
F43	20A	Seat
F44	10A	Fire extinguishing
F45	10A	Fuse parking lights reservation
F46	7.5A	Parking lights
F47	3A	Handles
F48	20A	Iqan XA2
F49	3A	Turning signals left
F50	5A	Headlight left front
F51	5A	Headlight right front
F52	10A	Fuel transfer pumps
F53	5A	High-beam headlight left
F54	5A	High-beam headlight right and signal light
F55	30A	+BAT main fuse in battery housing
F56	150A	Main fuse +30 in the trailer
F57	30A	CTA engine control unit
F58	150A	Engine intake air heater
F59	100A	Hydraulics filling pump
F60	30A	Outlet engine compartment
F61		Engine heater remote control in the unit

Do not fit an oversized fuse as it may damage the respective electrical instrument. If a fuse blows on the same location repeatedly, find out the reason for it.

Iqan control system

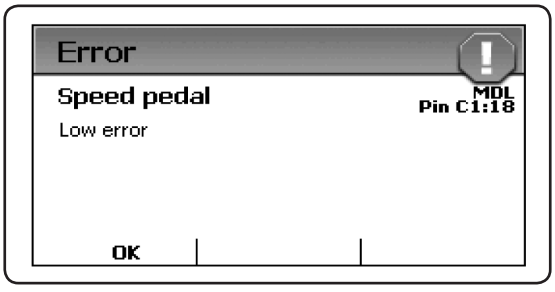


The Iqan monitor consists of the following elements:
- monitor display A
- bottom F1-F4 buttons B
- OK button C and the arrow buttons above and below it D
- Menu button E at the bottom right (three horizontal lines)
- Back button F (arrow to the left)

The display brightness can be adjusted by pressing the Menu button and selecting the back-light setting

SAFETY SYMBOLS

Various notifications and warnings can be displayed in the Iqan monitor. They appear in separate windows partly covering the basic display. The F1-F4 buttons of the display are used to select the most suitable option at the bottom of the warning window. For example, the sensor error in the picture here can be reset by selecting OK, or pressing the F1 button.



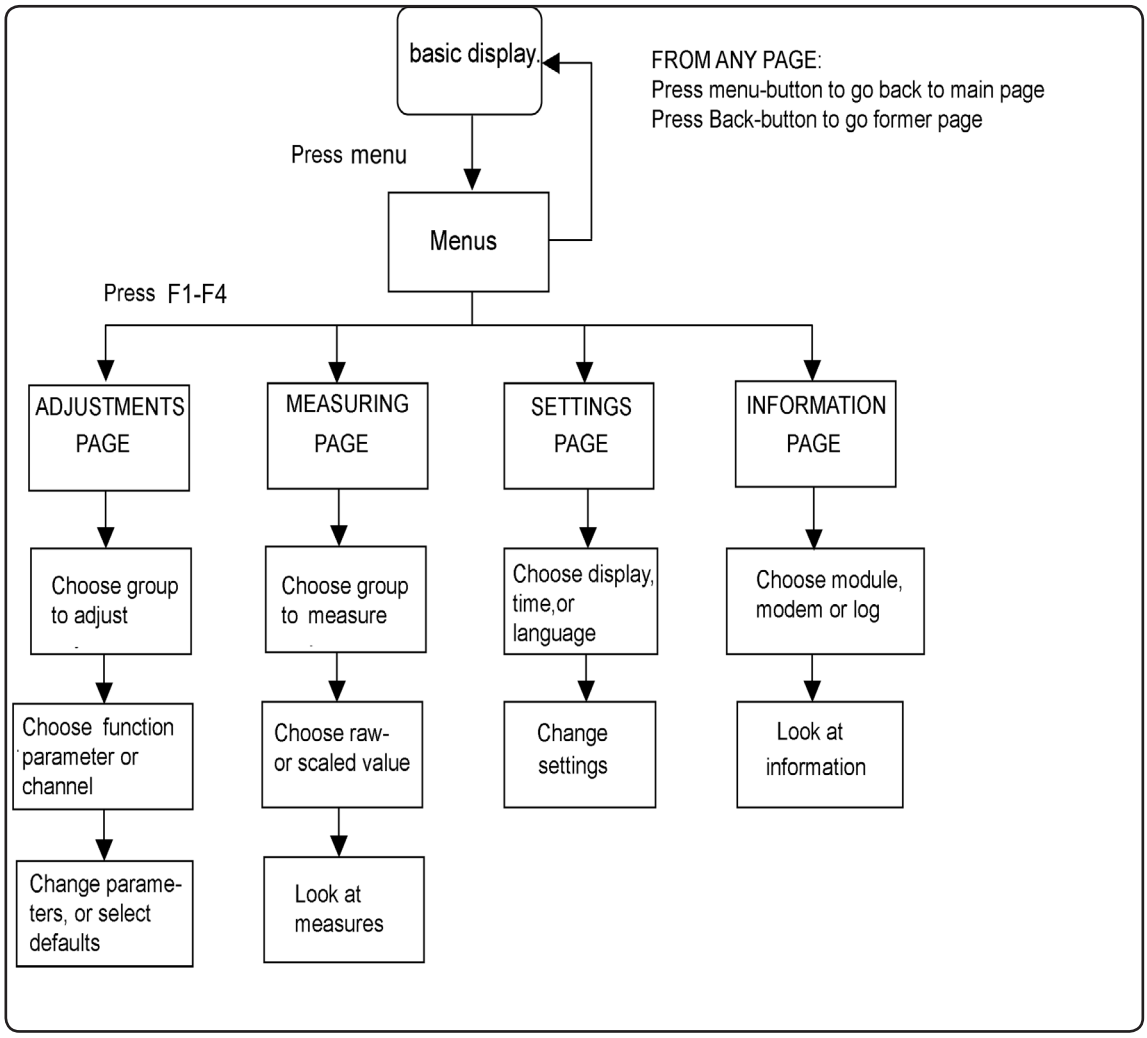
There are seven types of notifications and warnings. The type Message is the least serious and Critical is the most serious. The important notifications are always shown before the less critical ones. The following is a list of all notifications and warnings in the order of importance.

- message
- information
- confirmation
- warning
- alarm
- error
- critical

The notifications and warnings detected by the Iqan machine control system are always messages, alarms or errors. The notifications and warnings from the diesel engine and base machine are primarily information and warnings.

IQAN DISPLAY MENUS

The Iqan display has a graphical user interface and a menu structure. The menu structure is shown in figure 26.



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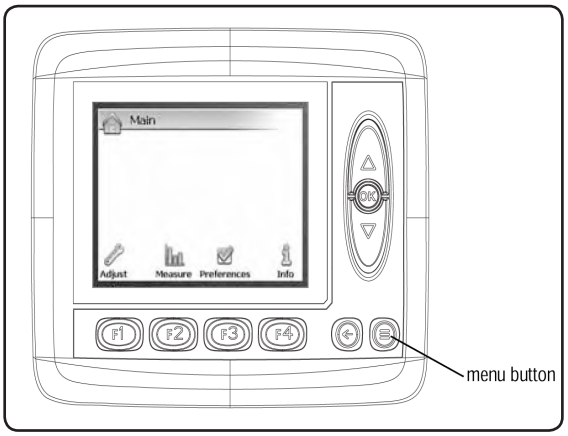
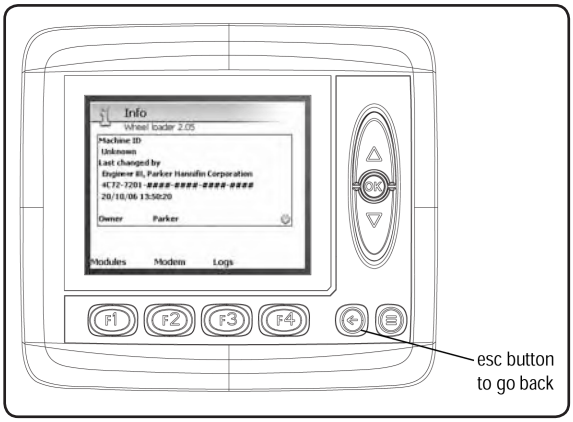
MAIN MENU

The menus contain the base machine setup, input and output measurements, settings and module status and related logs. The menus can be accessed by pressing the Menu button (three horizontal lines). Pressing the Menu button again takes you back to the basic display.



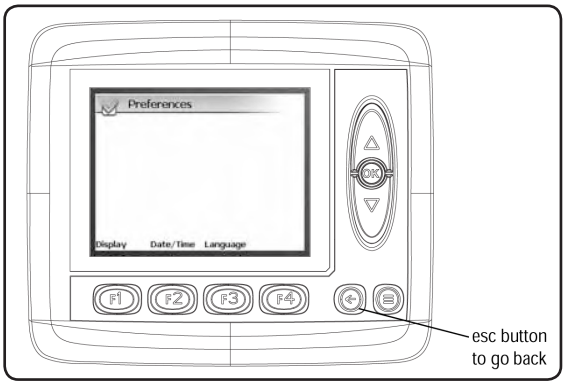
SYSTEM INFORMATION

When you press the F4 button in the main menu, you can view system information such as the name of the software loaded in the monitor, author of the last revision and the date of the revision. By pressing F1, F2 or F3 you can view information on modules, the modem or log. The Back button takes you back to the previous page. Pressing F1 on the subpages takes you directly back to the main menu.



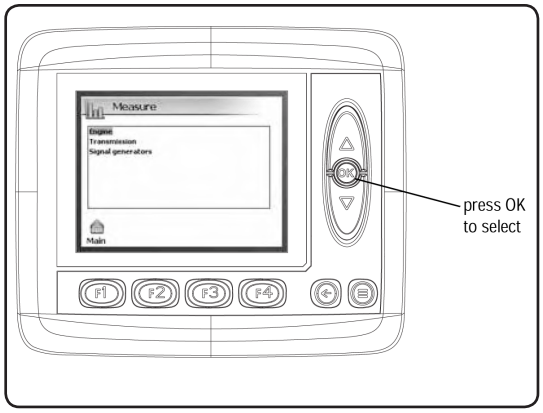
SETTINGS

You can change the display settings by clicking the F3 button in the main menu. Then by pressing F1, F2 or F3 you can view information on the display, date and time as well as language. The Back button takes you back to the previous page. Pressing F1 on the subpages takes you directly back to the main menu.



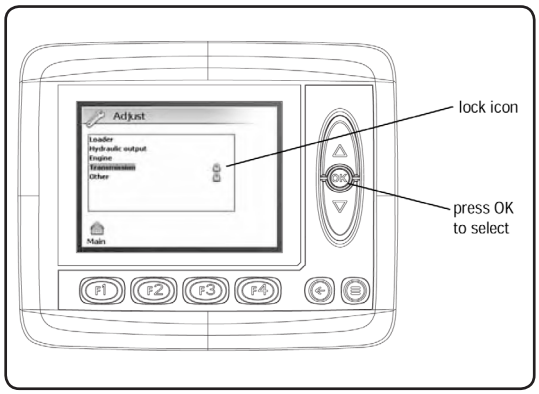
MEASURING

You can measure the sensors and valves connected to the Iqan control system by pressing F2 in the main menu. First, a page with different measurement groups such as crane, joysticks, steering/rotator etc. opens. The desired measurement group is selected with the up/down arrows and by pressing OK. Use the arrow buttons also to select a measurement route such as a sensor or valve. You can toggle between the raw value provided by the route and the scaled value using the F2 button. The Back button takes you back to the previous page. Pressing F1 on the subpages takes you directly back to the main menu.

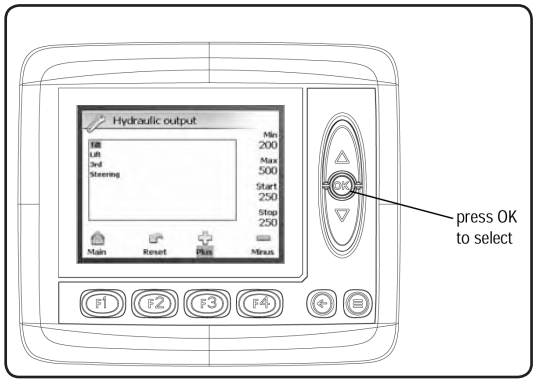


ADJUSTMENTS

You can access several outputs and parameters in order to adjust them by pressing the F1 button in the main menu. First a page opens on screen with a number of adjustable groups such as diesel engine revolutions, crane adjustments, driver selection, function parameters etc. The desired adjustment group is selected with the up/down arrow buttons and by pressing OK. A lock symbol may be displayed behind the adjustment group name. This means that a password is needed for adjustments.



After selecting the adjustment group, select the desired measurement route such as a sensor or valve using the arrow buttons. Several instruments have two different directions of movement. The correct direction +/- is selected with the F3 or F4 button. The current adjustment values are displayed on the right side of the display. After you have selected the desired route and direction, press OK.



Adjusting a parameter
You are now on the page where the actual adjustment is done. You can move from one parameter to be adjusted to the next by pressing the OK button repeatedly. When you are at the parameter you want to adjust, press the up or down arrow button. The parameter value on screen changes with each time a button is depressed. You may reset to the default values at any time after the adjustment by pressing the Reset button, or F2. The Back button takes you back to the previous page. Pressing F1 on the subpages takes you directly back to the main menu.

INTERNAL DIAGNOSTICS OF THE IQAN DISPLAY

The Iqan display has its own diagnostics page showing information on the status of the display. You can access the diagnostics page by pressing the Back and the Menu buttons simultaneously while switching on the power. To exit the testing mode, switch off the power and switch it on again normally.

INSTRUMENT PANEL DISPLAY

The left side of the instrument panel display shows the diesel engine revolutions both as a tachometer and as numerical values. On the right center is the fuel gauge. Above the fuel gauge is the oil temperature gauge and below the fuel gauge, the coolant temperature gauge. These temperatures are also displayed as numerical values.

When the power is on but the diesel engine off, the display shows red alarm symbols. The section Signs and symbols explains the meaning of the symbols. When the diesel engine is on, the symbols disappear from the display if the parts they refer to function correctly. A symbol that is displayed while the diesel engine is on indicates an active problem. After resetting the error message, the problem may continue to be active and the symbol remains visible indicating a problem. These problems indicated by the symbols will also activate the yellow alarm light in the ceiling of the cab. Investigate the cause of an active problem immediately and take the necessary corrective measures.

When selecting first gear, number 1 appears in the left upper corner of the display indicating that gearstick is pushing 1-gear switch. When selecting second gear, number 2 appears.

There are symbols of differential lock (front) and hydraulic differential lock (rear) in the left lower corner of display. The lock-symbol is either open or closed depending if lock is switched on or off.

When selecting four wheel drive, 4WD- symbol appears in the lower left corner of the display.

SUBMENUS

The images and text at the bottom of the main display indicate the functions of the F1-F4 buttons in each display. The purpose of these submenu displays is to provide you with some of the most important facts collected on templates.

Adjustments

When pressing the F1 button in the main menu, a window opens in which you can select the crane adjustments, driver selection and function parameters.

The function parameters open a new page on which you can select the vibration filters, power limits or other parameters.

You can return to the previous page from the subpages by pressing the F4 button.

Adjusting the diesel engine revolution speed

When you press the F4 button in the main display, the diesel engine revolution adjustment window opens.

In this window, you can

- adjust the idle speed by pressing F1
- adjust working revolutions by pressing F2
- adjust full throttle by pressing F3
- return to the main page by pressing F4

Diesel temperatures, oil pressure and operating hours

When you press the F2 button in the main display, a page opens displaying the diesel engine coolant temperature, fuel temperature, intake air temperature and oil pressure.

When you press F1, you can view the total hours, operating hours and working hours.

The total hours indicate the time that the machine power has been on. The operating hours indicate the time the diesel engine has been on. The working hours indicate the time the diesel engine's speed has exceeded 1,200 rpm. You can return to the main display from the subpages by pressing the F4 button.

Crane measurements

Pressing the F3 button in the main display opens a window showing the status of the crane controls. You can return to the previous page from the measurement pages by pressing the Back button.

Parameters in the iqan control system

Below you can find a list with explanations of the data adjustable and observable on the display.

INPUTS

Voltage Inputs:	
VIN Tilt Sensor [°]	The crane side tilt sensor (range -15°...+15°)
VIN Hand throttle	Select the diesel engine revolution direction
VIN Fuel sensor	Fuel level sensor
VIN Hydraulic oil temperature	Hydraulic oil temperature sensor
VIN Alarm symbols	An indicator for low hydraulic oil level, blocked diesel engine intake air filter as well as for blocked vacuum, pressure and return filter of the hydraulics
Digital Inputs:	
DIN Ignition	Ignition key information
SW Activation	A door switch that stops the crane, frame steering and rotator movements
DIN Joint angle	Sensor that grounds the input when the frame steering angle is wide
DIN Steering/rotator [%]	Selects whether the right joystick controls the stee ring of the frame or rotation of the head°
Mini/EME sidetilt right	Side tilt switch data (mini/EME lever)
Mini/EME sidetilt left	Side tilt switch data (mini/EME lever)
Banana sidetilt right	Side tilt switch data (vertical grip)
Banana sidetilt left	Side tilt switch data (vertical grip)
Harvester Head closed	Head closed (vertical grip/EME lever)
Harvester Head open	Head open (vertical grip/EME lever)
SW Steering angle	End dampening sensor for articulated steering
DIN Side tilt automation on	Selects whether the crane side tilt automation is on or off
DIN Side tilt automation reset	After the start of the harvester or manual use of the side tilt, the crane does not return to the center posi tion automatically until the reset button is pressed.
DIN Side tilt automation reset (vertical levers)	After the start of the harvester or manual use of the side tilt, the crane does not return to the center posi tion automatically until the reset button is pressed on the vertical levers.
SW Differential lock switch act.	Differential lock switch information.
DIN Drive pump zero angle sensor NPN	Sensor that grounds the input when the drive pedals are in the center position
DIN Gear 1 engaged	Sensor for gear 1
DIN Gear 2 engaged	Sensor for gear 2
DIN Four wheel drive button	Four wheel drive switch information
DIN Four wheel drive lock button	Four wheel drive lock switch information

Joystick Inputs:

JS Steering/Rotator [%]	Articulated steering/ Rotator
JS Lift [%]	Crane lift
JS Harvester Head [%]	Head open/closed
JS Slew [%]	Crane slew
JS Jib [%]	Crane jib
JS-Tilt [%]	Crane side tilt

Adjustable parameters

FP Idle [rpm]	Diesel engine idle speed
FP Working revolutions [rpm]	Diesel engine working revolutions
FP Full throttle [rpm]	Diesel engine maximum operating speed
JS Trigger + [%]	If the joystick is turned to the right more than the % value, the harvester head rotator will start rotating to the right.
JS Trigger – [%]	If the joystick is turned to the left more than the % value, the harvester head rotator will start rotating to the left.
Tilt Down Up Setting [1/0]	With the value at 1, the harvester head automatic tilt up is in use after the head open function. With the automa tic tilt up it is also required that the head open button or lever is pressed for more than 0.7 seconds.
FP Steering Deceleration [%]	Deceleration speed of articulated steering while end dampe ning happens
FP Autotilt Stopping Angle [°]	Side tilt automation does not try to correct deviations from the mid-position smaller than this angle. Standard setting ±1.5°
FP-Autotilt Deceleration Angle [°]	The angle at which side tilt automation starts decelera ting movement speed towards mid-position. Standard setting 6°
FP-Autotilt Start Slope [ms]	Side tilt automation acceleration ramp at the beginning of the correction movement
FP Side tilt sensor installed [1/0]	Defines whether the side tilt sensor has been instal- led. The value 0 disables the sensor.
Lever selection [1/0]	The value for the mini levers and EME levers should be 1
FP Dampening Steering	Dampening of vibration in the frame steering. Prevents the vibration from the hand from transferring to the steering. The greater the value, the greater the hand vibration that is dampened.
FP Dampening Turn	Dampening of the vibration in the crane turn. Prevents the vibration from the hand from transferring to the crane. The greater the value, the greater the hand vibration that is dampened.
FP Dampening Lifting	Dampening of the vibration in lifting. Prevents the vibration from the hand from transferring to the crane. The greater the value, the greater the hand vibration that is dampened. .
FP Dampening Angle	Dampening of the vibration in the crane angle. Prevents the vibration from the hand from transferring to the crane. The greater the value, the greater the hand vibration that is dampened.

FP Dampening Side tilt	Dampening of the vibration in the crane side tilt. Prevents the vibration from the hand from transferring to the crane. The greater the value, the greater the hand vibration that is dampened
FP Steering power limit	Deceleration of the frame steering speed to the value set with this parameter when the diesel engine revolu tions decrease under load. The smaller the value the smaller the effect.
FP Turn power limit	Deceleration of the crane turning speed to the value set with this parameter when the diesel engine revolu tions decrease under load. The smaller the value the smaller the effect.
FP Lift power limit	Deceleration of the crane lifting speed to the value set with this parameter when the diesel engine revolu tions decrease under load. The smaller the value the smaller the effect
FP Angle power limit	Deceleration of the crane angle speed to the value set with this parameter when the diesel engine revolu tions decrease under load. The smaller the value the smaller the effect
FP Side tilt power limit	Deceleration of the crane side tilt speed to the value set with this parameter when the diesel engine revolu tions decrease under load. The smaller the value the smaller the effect.

OUTPUTS

Current Outputs:

PV Lift [%]	Crane lift (proportional)
PV Steering [%]	Harvester articulated steering (proportional)
PV Sidetilt [%]	Crane Sidetilt (proportional)
PV Jib [%]	Crane jib (proportional)
PV Slew [%]	Crane slew (proportional)

Digital Outputs:

DOUT-Start diesel	Diesel engine start
DOUT-Differential lock	Differential lock engaged
DOUT-Four wheel drive	Four wheel drive engaged
DOUT-Four wheel drive lock engaged	Four wheel drive lock engaged (hydraulic)
DOUT-Break and frame lock disengaged	Automatic control of the breaks and the frame lock

Service and maintenance

Safety

Installations and adjustments may be carried out only by a person with the required skills and qualifications and the necessary knowledge of the machine in question.

Installations and adjustments as well as repairs must be carried out when the engine is stopped and the key removed from the ignition. Moving parts must be in balance and stopped,and when necessary, locked.
For example, the crane and harvester head may move or slide on their own over time.

Make sure that there is no stored pressure in the fluid systems before you open mechanical or hydraulic joints (pressurized oil tank, harvester head pressure battery, AC equipment, radiator etc.)

Make sure there is no danger of injuries if you need to start the engine while performing maintenance and also after maintenance work.

Ensure that all periodic maintenance work and cleaning are performed on schedule in accordance with the instructions. This reduces the risk of danger caused by malfunctions.

Proper maintenance and service guarantee a long working life and the validity of the warranty.

General instructions:

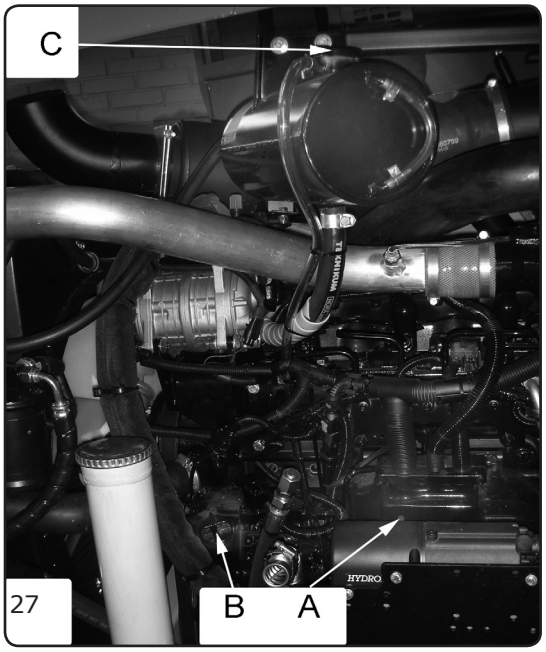
- Make sure you are sufficiently qualified before you perform maintenance tasks. If you are not sure, have the work performed by a qualified individual.
- Familiarize yourself with the structure of the harvester and the maintenance instructions before you start the maintenance work.
- Wear protective clothing suitable for the work
- Use appropriate tools and other equipment.
- Handle the machine to be maintained and the substances used as instructed so that there is no danger to yourself, other people or the environment.

Service measures daily or every 8 hours

1. Checking of the engine oil level

Stop the engine on level ground and wait for a few minutes. The oil level shall be between the marks on the dipstick. Fig. 27.

Fig. 27
A Oil measuring dipstick
B Oil filler
C Coolant check / refill



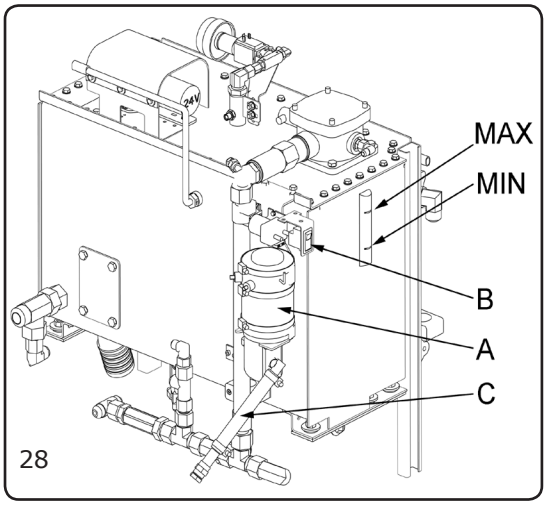
2. Checking of the coolant level

Note! Open the over-pressurised radiator cap with great care when the engine is hot.
Never use plain water as coolant!
Do not pour cold coolant into a hot engine.
The coolant level shall be approx. half way up the expansion tank.
Coolant is added through the expansion tank.
Make sure there is anti-freeze in the radiator in the cold season.

3. Checking of the hydraulic oil level

Check the hydraulic oil level in the measuring glass on the tank with the lift cylinders in their inner position.

Note! The oil level shall always be visible in the measuring glass.
Add oil using the oil refill pump A (figure 28). The pump starts from switch B and oil is sucked into the tank through hose C. This will leave all the impurities in the filter.

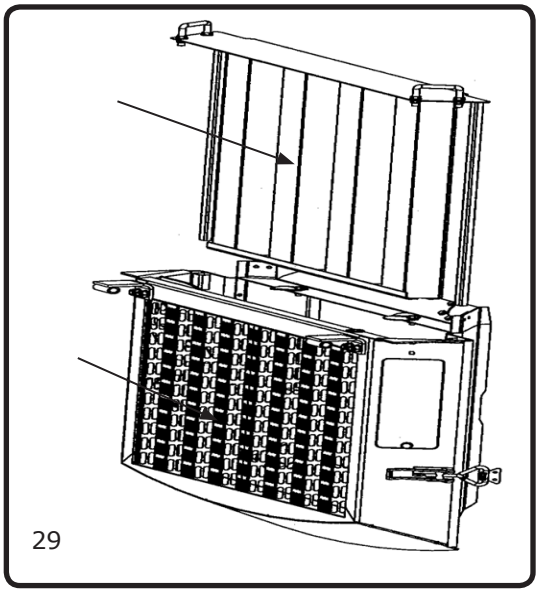


4. Daily lubrication

Lubricate the daily lubrication points in compliance with the lubrication table. See Lubrication Table.

5. Cleaning of radiator grilles

Depending on the operating environment, the radiator grilles shall be cleaned often enough to prevent the engine from overheating. Clean the rear cog screen and the removable grille using compressed air or a brush (fig. 29). When necessary, clean the oil, engine and air conditioner condensers.
Note! The rear cog and the grilles must not be covered with the engine running.


29

6. Checking of tyre air pressure

Check the tyre air pressure and external condition visually. Use manometer if necessary. The correct air pressure for the 500/60-26.5 tyres is 3.7 bar, the 600/55-26.5 tyres 4.0 bar, the 540/65R28 tyres 3.2 bar.
Do not exceed the indicated pressures.

7. Checking for leakage

Check for any liquid, fluid and oil leakage.

8. Checking of connections

Check the screw and pipe connections visually.

NOTE! During the first operating month the tightness of the screw connections in the crane, shafts and joint shall be checked daily.

It is important to tighten the screw connections to the correct torque. The required wrench sizes and torques:

Screw size	Wrench size (mm)	Tightening torque for screws of 8.8 strength class (Nm)
M 6	10	11
M 8	13	25
M 10	17	47
M 12	19	78
M 14	22	120
M 16	24	180
M 20	30	335

NOTE! Tightening torques for wheel fixing screws

Front wheels: 600 Nm
Rear wheels: 540 Nm

Service measures weekly or every 50 hours

1. All daily service measures

The service measures to be taken every 50 hours include all the measures listed in service measures daily or every 8 hours.

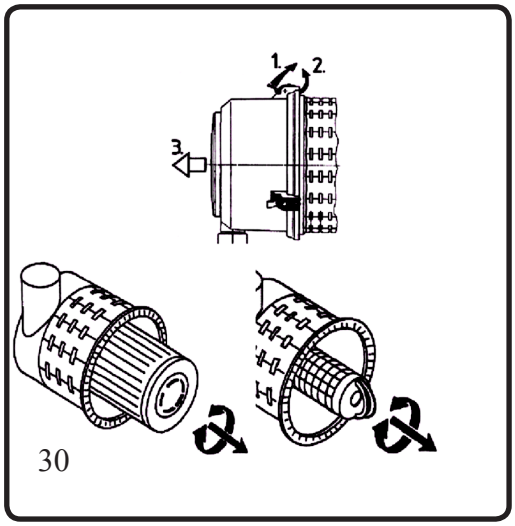
2. Lubrication in compliance with the lubrication table

Lubricate in compliance with the lubrication table paying attention to any special instructions. See the lubrication table.

Service measures every 100 hours

1. Cleaning of engine air filter

The engine suction air is cleaned by a pre-filter and a dry paper filter of a dual-element type. Faultless functioning of the filter is of utmost importance to the long lifespan of the engine. The filter housing is located in the engine compartment. The filter housing cover is fastened with locking brackets and the filter cartridges are under the cover (fig. 30). The outer filter cartridge shall be replaced when blockage is indicated on IQAN- monitor or at least every 100 hours. The outer cartridge can also be cleaned, but no more than five times. Open the locks on the rear filter cover and twist the cartridge out of the housing. Be careful not to damage the paper. Do not remove the inner cartridge unless it needs replacing. The filter protects the suction channel against impurities during service.



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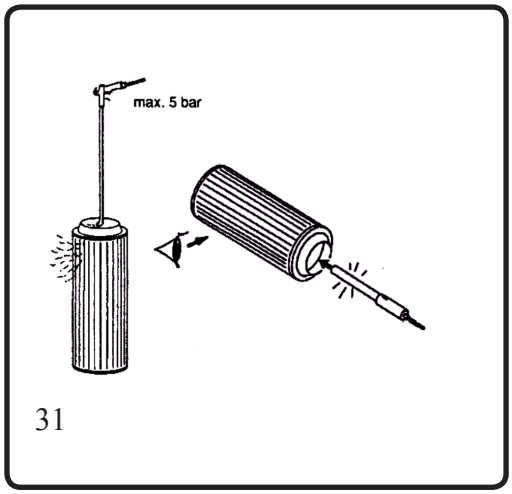
Blow dry compressed air (not over 5 bar) inside the filter. Great care shall be taken not to damage the filter cartridge or allow dust inside.

After cleaning, check the condition of the filter. Direct a strong light from the inside. In case the outer filter cartridge is broken, it shall be replaced. The inner filter shall also be replaced as it has become dirty. Otherwise the inner cartridge is replaced after five filter services or every other year.

Clean the inside of the filter housing carefully before removing the inner cartridge. When refitting the filters, make sure that the gaskets are intact, the mating surfaces clean and that the filter fits well.

When servicing the filter, check the condition and attachment of the air hoses and the cleanliness of the hose in the exhaust fume ejector.



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NOTE! Never run the engine without filters.

2. Checking of battery fluid level

Clean the battery housing carefully. Check that the battery fluid level is 5-10 mm above the cells. Make sure the cable lugs are properly tightened. Remove any oxidisation with hot water. Coat the cable lugs with copper or aluminium paste.

3. Cleaning of breather on the hydraulic tank

Clean the filter and the surrounding area carefully (fig. 32).

4. Checking of the condition of traction transmission

Check the attachment of final drives, drive shafts and gearbox. Ensure there are no cracks. Check the attachment of the hydraulic pump and motors in traction transmission. Check for leaks in hose connections.

5. Cleaning of cab air filter

Remove the cab fresh air filter with its housing and clean it carefully with compressed air. Replace a soiled or broken filter. The paper filter shall be replaced at least once a year. Check also the condition of the air intake suction channel.

6. Checking of gearbox oil level

Clean the dipstick and breather area. The oil level shall be between the bottom of the dipstick and the mark on the dipstick with the dipstick screwed on. Refill in compliance with the oil table (fig. 33).

7. Checking of light operations

Make sure the headlights, working lights, turning signals and signal lights function properly. When replacing bulbs, comply with the Manufacturer´s recommendations.

8. Draining of water out of water separator

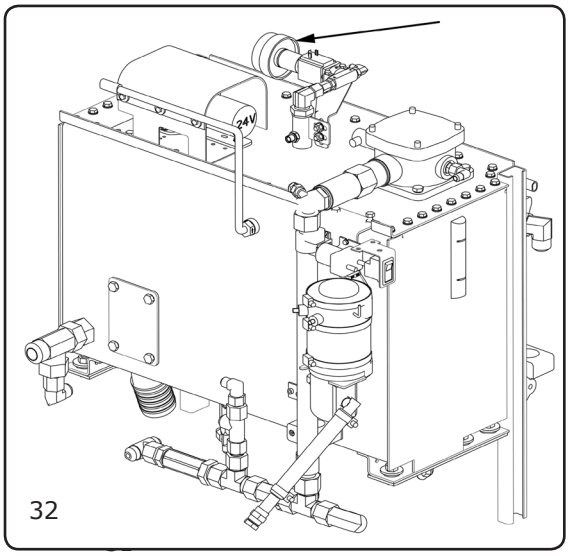
The fuel pre-filter with water separator is located on the left side of the engine Drain any accumulated water into a dish weekly. Replace the filters in compliance with the service table or more often if you suspect a clogged filter. Fault code "Fuel pressure low" indicates a clogged pre-filter or air leakage in the pipes. When changing the filter, remember to take the metal water separator plug from the old filter.
Used filters are problem waste that must be dealt with accordingly. For further instructions, refer to the engine manual.

9. Checking of oil level in final drives

Clean around the control opening and breather. The oil level should come up to the control opening. When necessary, refill oil through the breather until oil runs out of the control opening. Refit the breather and control plug and wipe off excessive oil (fig. 34).

10. Checking of brake functions

The brakes shall be adjusted regularly due to the wear of the brake bands. The free travel of the brake pedal shall be 20-50 mm. Make sure the harvester cannot move, start



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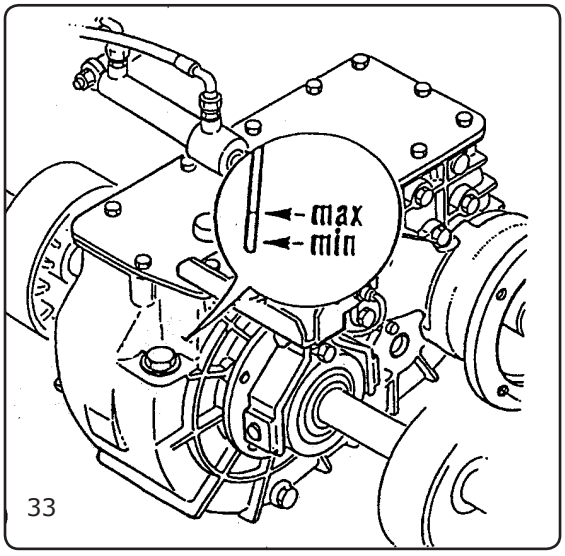

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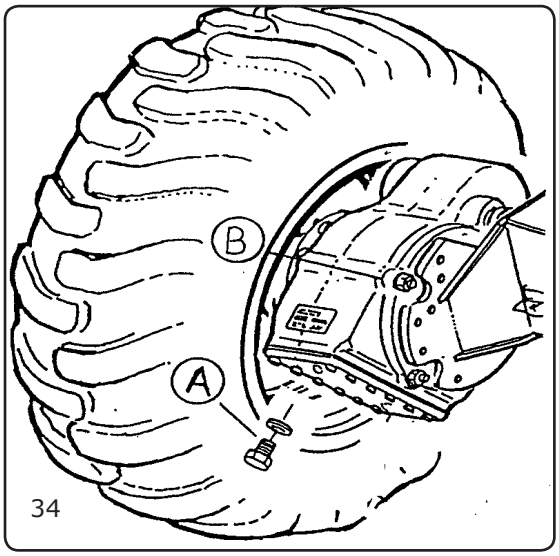

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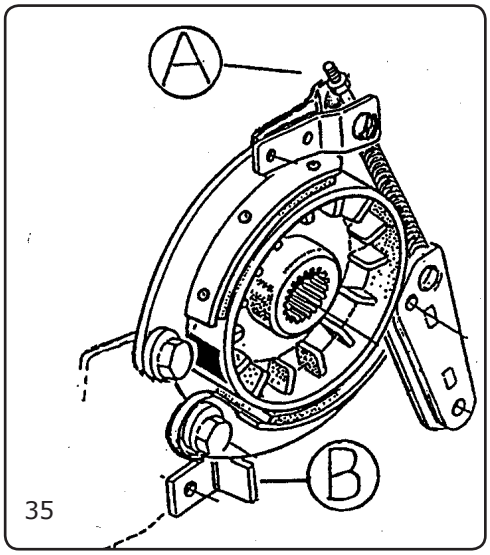
A Control opening
B Breather

the engine and disengage the brakes. Make sure the clearance in the lower brake shoe is approx. 1 mm. Adjustments can be made by turning limiter B. Adjust the clearance in the upper brake shoe using adjusting screw A. The clearance between the brake shoe and drum shall be the same on both sides of the harvester to achieve even braking.
Fig. 35
A Adjusting screw
B Limiter



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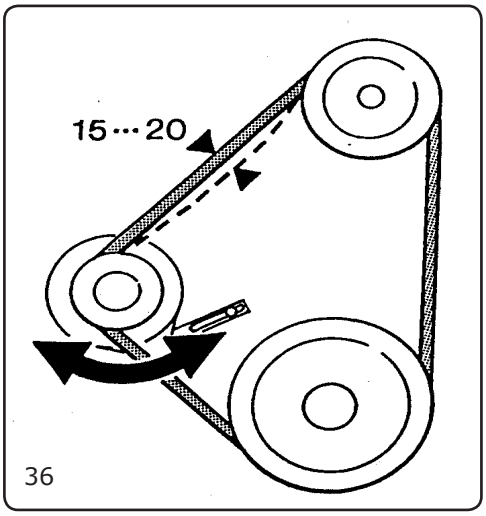
11. Checking of belt tension

Check the tension of belts in the water pump, generator and optional air conditioner. The tension is correct when there is a deflection of 15-20 mm when pressing with your thumb. Replace worn and damaged belts (fig. 36).

12. Cleaning of polycarbonate windows

Remove any particles that may damage the window surface. Avoid using any sharp objects. Use mild and environmentally friendly detergents and plenty of water for washing.
Substances suitable for removing stains include pure isopropyl alcohol, white spirit, heptane, white gas, butyl etylene glycol, methanol, hexane and butanol. Use plenty of water for rinsing after the removal of stains.

NOTE! Do not use other solvent substances such as gasoline for cleaning windows.



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Service measures every 500 hours

1. All daily and weekly service measures.

The service measures to be taken every 500 hours include all the measures listed under service measures daily or every 8 hours as well as the measures listed under service measures weekly or every 50 hours and every 100 hours.

2. Changing of engine oil and filter

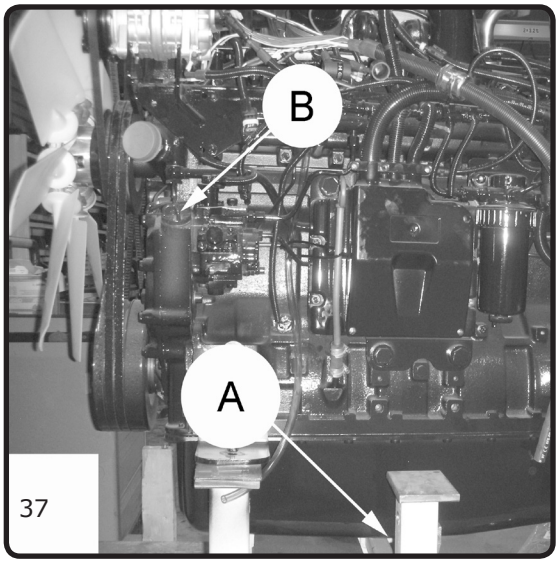
Keep the engine running until it warms up. Open the drain plugs A in the underpan and the engine sump . Drain the oil into a pan. When all the oil has been drained, close the drain plug with a new gasket (fig. 37).

The oil filter is replaced every time the oil is changed. Clean around the oil filter. Remove the old filter using a filter key. Coat the gasket of the new filter lightly with new oil (fig. 38), and make sure the gasket surfaces are clean. Attach the filter manually. Wipe off any excessive oil. Pour new oil through the filler B to the top mark on the dipstick. Pay attention to the amount of oil poured into the filter.

Acceptable oil types and amounts are given in the Lubrication Table and the Engine Manual. For further instructions, see the Engine Manual.

NOTE! Only use oil recommended by the manufacturer

Check the engine breather pipe every time the oil is changed. The pipe shall be clean inside and it must not be dented.



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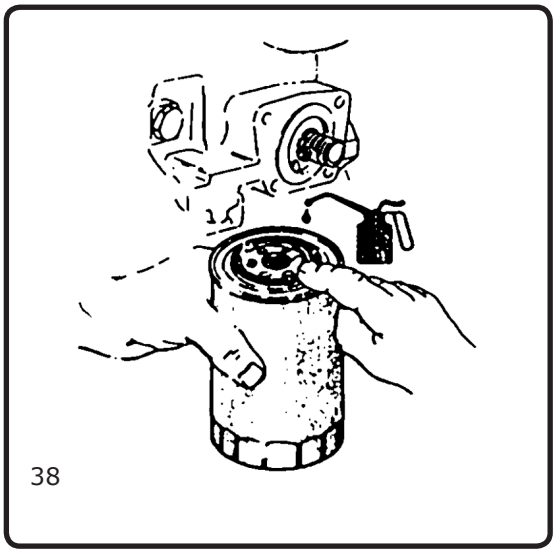
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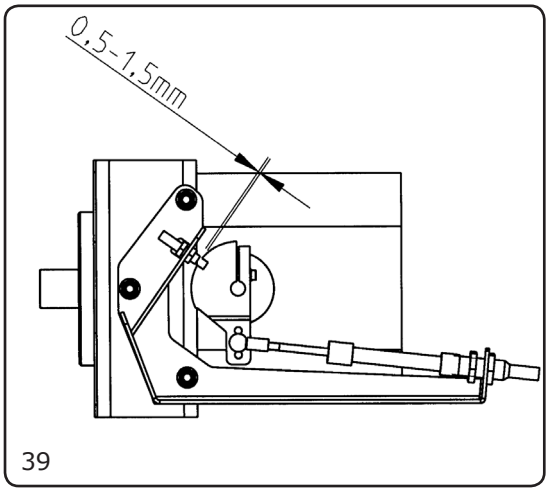
3. Checking of the operations of the drive pedal

Check the operation and position of the drive pedal. The pedal shall move to its mid-position as the foot is removed off the pedal. Lubricate the drive chain and centralising device when necessary.

The frame lock and the brakes shall be disengaged slightly before the harvester starts moving.

The disengagement is controlled by an inductive switch located on the drive pump. Turn off the engine and secure the drive pedal in its forward drive position. The distance of the inductive switch from the lever arc shall be 0.5-1.5 mm. Release the drive pedal and adjust the switch in the middle of the lever notch. The relation of the brake and frame lock operations to the start-up of the harvester can be adjusted by changing the distance of the inductive switch from the lever arc. The distance shall, however, remain within the recommended limits. See fig. 39.



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4. Use Of An Additional Heater And Air Conditioning Outside The Heating Season

The heater shall be used approx. once a month outside the heating season, too. This is done to prevent the fan motor and water pump from getting stuck. Also air conditioning must be used at least once a month.

5. Replacing Of The Hydraulic Oil Filters
For more information on filter replacement, see items Service Measures Every 1000 Hours.

6. Checking Of Screw Tightness After The First 500 Operating Hours
Screw tightness in the crane and joint shall be checked after the first 500 operating hours. Torque for the crane M24x2 screws in strength class 10.9 is 1000Nm and in strength class 12.9 1200Nm.

Torque for the M10 screws in the joint (strength class 10.9) is 68Nm, for the M16 screws (strength class 10.9) torque is 300Nm, and for the M20 low-headed screws (strength class 10.9) 550Nm, and for ordinary hexagonal socket-head screws 700Nm (strength class 12.9).

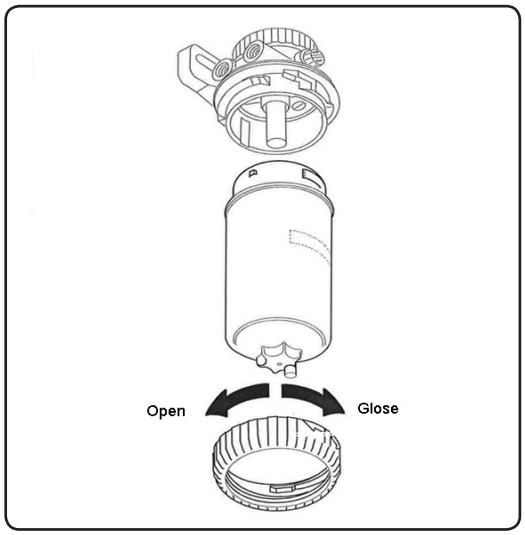
7. **Adjusting the diesel engine valves**
Adjust the diesel engine valves after the first 500 operating hours and then every 1000 operating hours.
For detailed information, see the engine manual.

Service measures every 1000 hours

1. All service measures to be performed daily, weekly and every 100 and 500 hours
The service to be performed every 1000 hours includes all the service measures listed under service measures daily or every 8 hours, service measures weekly or every 50 hours and service measures every 100 and service measures every 500 hours.

2. Changing of the fuel filter
See instructions in the Engine Manual, fig. 40.

3. Draining of condensed water out of the fuel tank
Run a little fuel from the filler at the front of the fuel tank into a pan.



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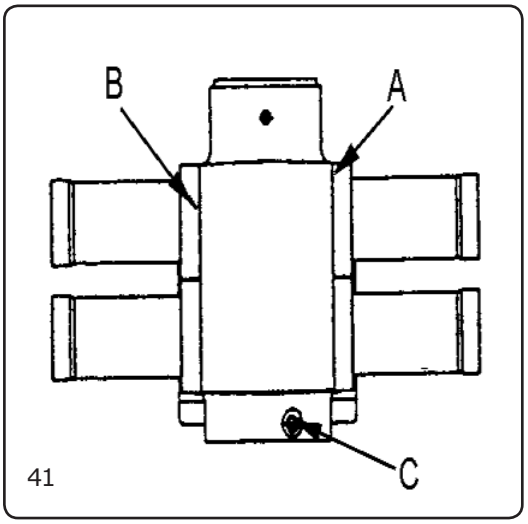
4. Changing of the oil in the crane turning motor
The oil in the turning motor (fig.41) is changed every 1000 hours. However, the first time the oil is changed after 50 hours. See further instructions in the crane manual.
Refill in accordance with the oil table.
A Fillling opening
B Control opening
C Drain opening



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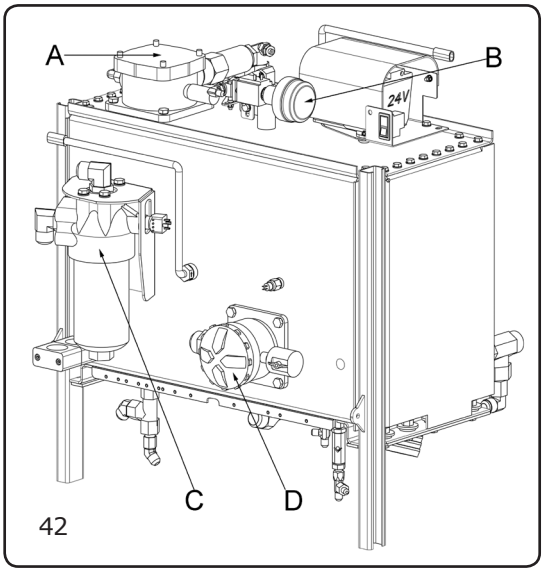
5. Changing of the hydraulic oil filter
Change the filters in the working and traction hydraulics (fig. 42).
A Return filter
B Breather
C Pressure filter
D Suction filter

The hydraulic oil does not need to be drained when changing the filters. When changing the suction filter in the traction hydraulics, you need a pan to collect about 1.5 litres of oil that is drained.
See further instructions in item SERVICE MEASURES EVERY 1500 HOURS



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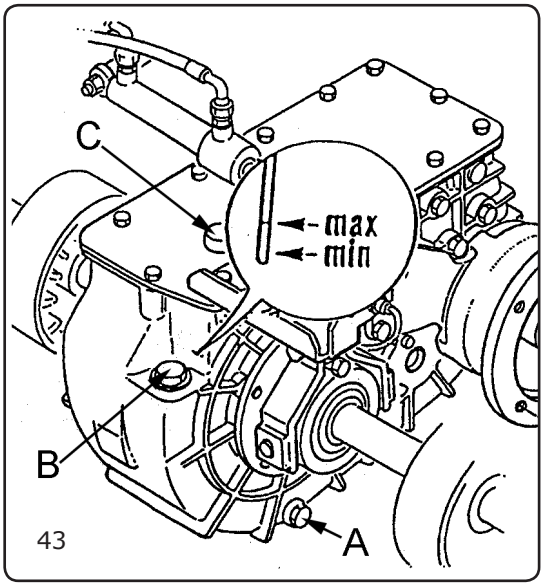
6. Changing of gearbox oil

The oil is drained by unplugging oil drain A (fig. 43). New oil is poured into filler B. Gearbox oil amount is ca.4 litres. The oil level shall be between the bottom of the dipstick and the mark on the dipstick with the dipstick screwed on. Check and clean breather C on the cover. Used oil is problem waste, which shall be disposed of in an appropriate manner.
Use an oil type in accordance with the oil table (see chapter **LUBRICATION**).



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7. Checking condition of hydraulic hoses

Check The condition of hoses. Replace worn out and leaking hoses to New. Replace all hoses with new ones at least once in 15 years.

8. Checking air hoses of cooler and engine

Check hoses visually. Replce with new if needed. Engine's cooling water hoses must be changed at least every five year.

9. Adjust diesel engine valves

See instructions in the engine maual.

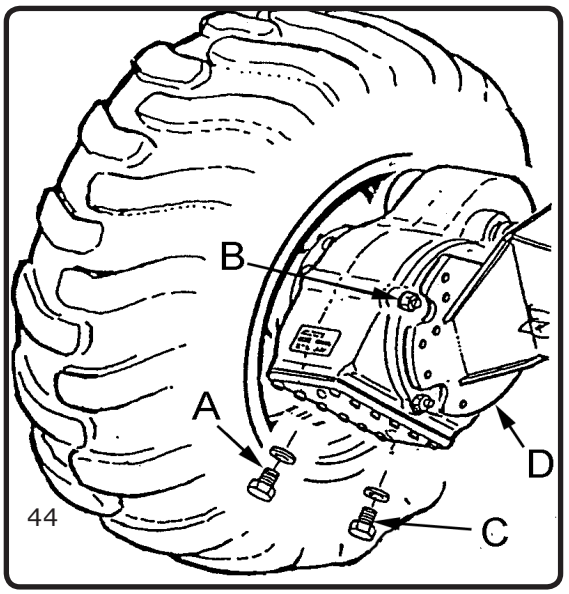
Service measures every 1500 hours

1. All service measures to be performed daily, weekly, every 100 and 500 hours

The service to be performed every 1500 hours includes all the service measures listed under service measures daily or every 8 hours, service measures weekly or every 50 hours , service measures every 100 and service measures every 500 hours.

2. Changing of the oil in the final drives

Clean around control opening A, breather B and oil drain C. Remove the protective plugs and drain the oil into a pan. Remove and clean magnetic plug D. Refit the magnetic plug and oil drain plug and pour the oil through the breather. The oil level should come up to control opening A. Refit the cleaned breather and control plug.
Used oil is problem waste, which shall be disposed of in an appropriate manner.
Use an oil type in accordance with the oil table. The right-side final drive holds approx. 5.2 litres and the left-side one approx. 5 litres of oil. See fig. 44.



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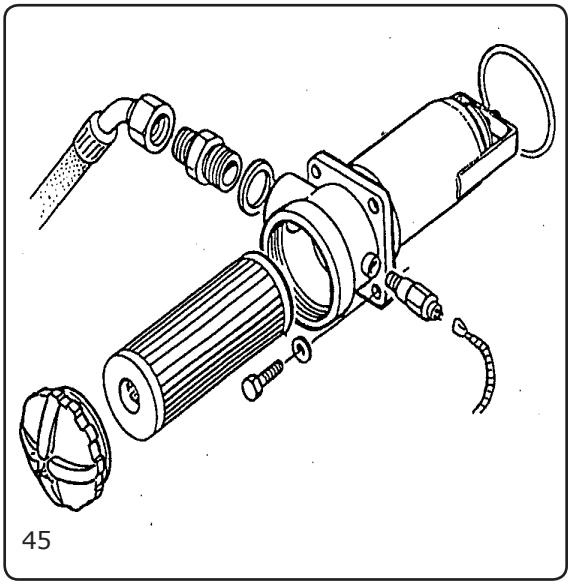
A Control Opening
B Breather
C Oil Drain Plug
D Magnetic Plug

3. Changing of hydraulic oil and filters

Traction and working hydraulics have a joint oil tank. Oil should be changed at least once a year. Before changing the oil, run the system until it is warm and adjust all the cylinders in their shortest position.

Oil is drained from the system by unplugging the drain plug at the end of the drain hose. Have a sufficiently large pan handy, as there is approx. 100 litres of oil. Clean around the filters carefully before removing them.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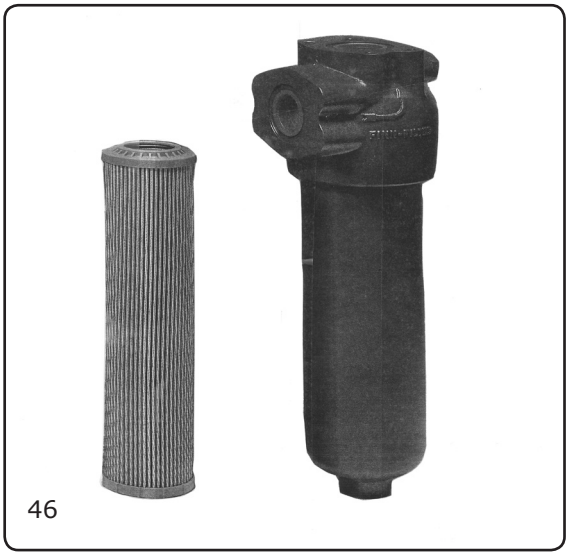
NOTE! The oil does not need to be drained when the filters are changed.

When changing the suction filter, turn the filter cover counter clockwise. Quickly turn the filter cartridge out to make the flap valve inside the filter close, which prevents more than the filter volume of oil from leaking from the tank. Turn the plastic plug at the bottom of the filter off and replace the filter cartridge, fig. 45.

The pressure filter is replaced by turning the bottom of the filter off, after which the filter can be replaced by hand, fig. 46.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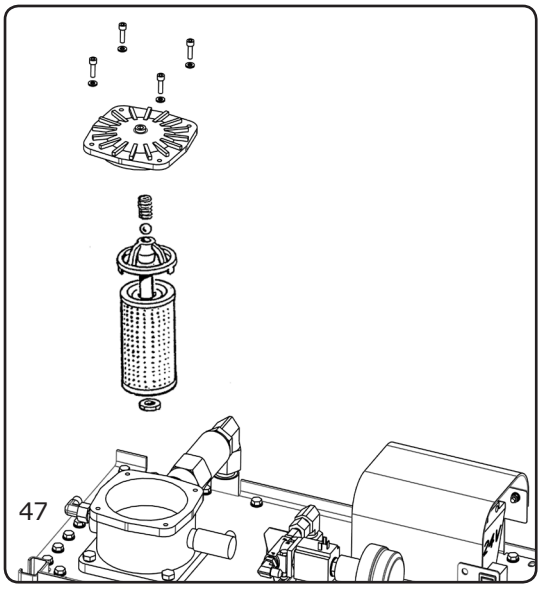
To change the return filters, unscrew the

four fixing screws on the filter cover. The cover is spring loaded, which means the screws shall be unscrewed evenly. Remove the fixing nut at the bottom of the filter element and change the filter cartridge (fig. 47).

Use only genuine filters and oil types in compliance with the oil table to guarantee perfect functioning. Make sure there are no impurities in the oil or the funnel.

After the oil change let the engine idle for approx. 30 minutes, during which time hydraulics must not be used. During this period the oil circulates through the filter several times and any impurities in the oil are filtered off. Monitor the oil level and check for any leakage in the filter.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There is a glass gauge on the side of the oil tank to monitor the oil level. The oil level shall be visible in the gauge window. Add oil, when necessary.
REFILL ALWAYS THROUGH THE RETURN FILTER PLUG!

At the base of the oil filter there is an alarm switch to indicate pressure loss through the filter. In case the alarm light is on in the cab and the oil is in its operating temperature, the filter cartridge is clogged and shall be replaced.

If hydraulic oil becomes over-heated

The temperature of the hydraulic oil should not exceed 70 degrees C. A temperature increase of 10 degrees cuts the oil lifetime in half. When the signal light comes on, the temperature of the hydraulic oil is 90 degrees. In this case you should wait long enough to let the temperature decrease. The engine can be kept running, but unloaded. Find out the reason for the excessive oil temperature. The most common reason is blockage in the radiator and its protective screens.

4. Checking of the functions of hydraulic signal lights

Earth the sensor cables of suction, pressure and return filters. The signal lights on the instrument panel should come on.

5. Checking condition of hydraulic hoses

Check The condition of hoses. Replace worn out and leaking hoses to New. Replace all hoses with new ones at least once in 15 years.

SERVICE MEASURES EVERY 2000 OPERATING HOURS

1. Inspect and clean the diesel engine injectors (EEM3 service tool)

SERVICE MEASURES EVERY 4000 OPERATING HOURS

1. Check compressor clearances / check the cleanliness of the intercooler element

For detailed instructions, see the SisuDiesel manual.

Service measures every 6 months

The fire extinguishers shall be serviced every 6 months or more often if so stipulated in local regulations.

Service measures every 1 year

If the harvester is equipped with an automatic extinguishing system, it shall be serviced as instructed by the Manufacturer. See Servicing of the Fire Extinguishing System in the Operator Manual. In some countries, an annual official inspection of the machine is required in the insurance terms and conditions.

Service measures every 2 years

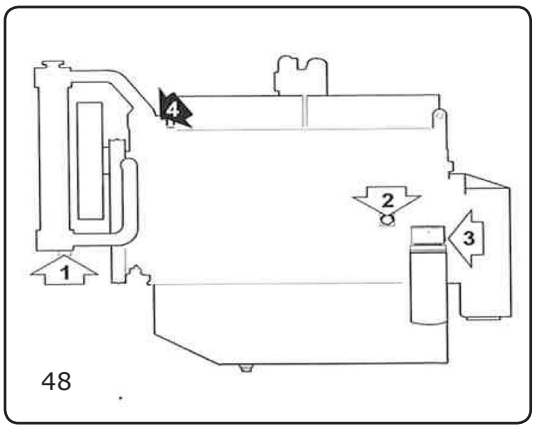
1. Replacement of the AC drying cartridge

To guarantee faultless functioning of the air conditioning, the drying cartridge needs to be replaced every 2 years.

2. Changing of engine coolant

The coolant shall be changed at least every other year to maintain its anti-corrosion properties. The cooling system is drained by opening the draining taps in the radiator water cell and on the left-hand side of the engine at the rear and by unscrewing the cap in the expansion tank. In order to drain the coolant from the heater cell, too, turn the thermostat to its maximum position.
Used coolant is problem waste, which shall be disposed of in an appropriate manner. Therefore the draining taps are equipped with connectors to which a collection hose can be attached to drain the liquid (fig. 48).

1. Radiator draining
2. Engine draining
3. Oil cooler draining
4. Bleeder plug



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NOTE! See further instructions in the engine manual.

The dual-functioning thermostat must not be removed to reduce the temperature, as this would make most of the coolant circulate through the side circulation pipe, which reduces cooling capacity.

On models equipped with an additional heater, air shall be bled from the heater when more coolant is added. See the heater instructions!

Lubrication

Do not lubricate while the engine is running. Remove the ignition key before starting lubricating. The table below gives recommended lubricants to be used in different temperatures. The table also gives different types of air conditioning liquids, although they do not normally have to be changed.
* If you want to use biodegradable hydraulic oils, consult the Manufacturer.

Recommended lubricant	Oil grade API	Viscosity SAE		Filling quantity l	Change interval
		-25…+30°C	+10…+45°C		
Engine - Common Rail	CI-4	10W40	10W40	12	500 h
Gearbox	GL–5	80W90	85W140	3,5	1000 h
Final drives, front	GL–5	80W90	85W140	right 5,3 left 5,0	1500 h
Hydraulics [1]	Shell Esso Shell	Tellus Arctic 32 Univis 32 TellusOil TX32	Tellus Arctic 32 Univis 46 TellusOil TX46	130	1500 h
Lubrication points	CB/CC	10W30	15W40	–	–
Grease points	Lithium grease	NLGI 2	NLGI 2	–	–
AC oil	PAG	500 SUS	500 SUS	1.8 dl initial fill	–
AC oil	HFC R134a	–	–	1.15 kg	–
Crane turning motor	See the crane manual				1000 h
Chain oil	See harvester head manual				

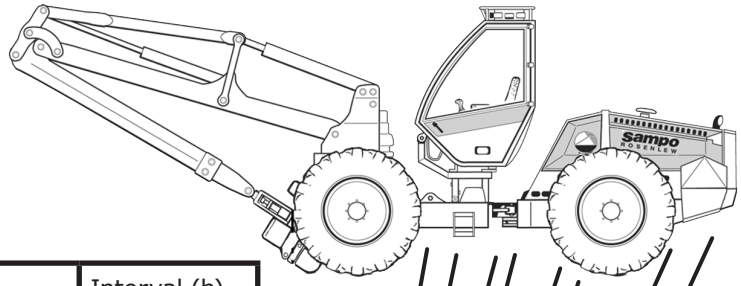
Initial fills
Engine: Shell Rimula R5 E 10W-40
Gearbox: Shell Spirax HD 80W-90
Hydraulics: Shell Tellus Arctic 32
Lubrication grease: SHELL Rhodina Grease EP2

The initial installation oils are those with a temperature range of –25...+30°, except in hydraulics where the oil should be Shell Tellus Arctic 32. In the first maintenance, switch to oil types suitable for the area where the machine is used.

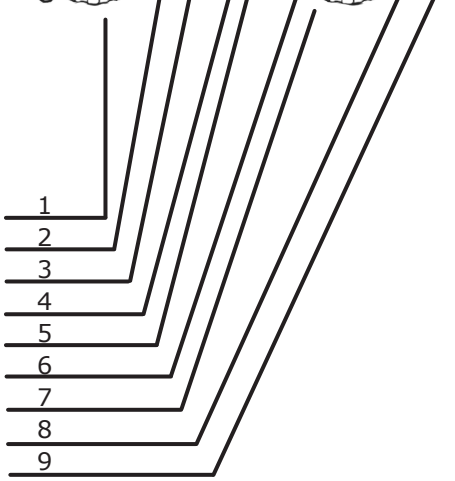
The guarantee is valid only when lubricants in compliance with the initial fill lubricants are used!
Correct lubrication is of major importance to the perfect functioning and long working life of the forest harvester, due to which the lubrication recommendations shall be followed carefully while simultaneously monitoring if any place requires more lubrication.

All the lubricants shall be free from impurities. Even the slightest impurities may cause damage. Oil fillers and nipples shall be wiped clean. Apply grease on the nipples in accordance with the lubrication table. Apply machine or engine oil to places to be oiled.

Lubrication diagrams

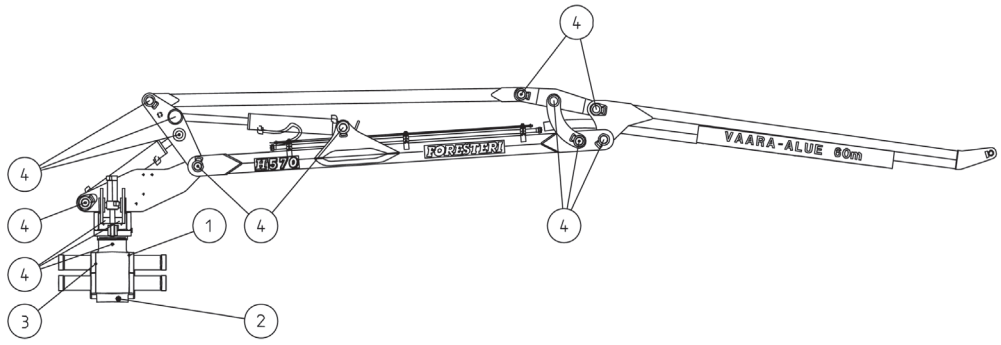


Ref.	Point	Interval (h)
	Harvester head	Daily
	Crane	10
	Drive shafts	50
	Differential lock	50
1	Final drives	1 500
2	Gear box	1 000
3	Brakes	50
4	Steering cylinders	50
5	Joint	50
6	Hydraulics	1 000
7	Frame lock	10
8	Engine	500
9	AC	



Lubrication of crane and changing of oil in turning motor

The crane is lubricated every 10 hours. The lubrication points are shown in picture
The oil change interval in the turning motor is 1000 hours.
Hypoid oil type SAE 80W/90, API GL-5 is used in the turning motor. See further instructions in the Crane Manual.



Ref.	Point	Pcs	Action	Interval hours
1	Turning motor, oil window	1	Checking	10
2	Turning motor, lower plug	1	Emptying, draining water twice a year	1000
3	Turning motor, upper plug	1	Filling, adding if necessary	1000
4	Joint- and sliding bearing	22	Greasing with press	10

Summary of periodical procedures

The summary always includes checks and service performed at shorter intervals. For more detailed crane and harvester head service instructions, see the respective manuals.

Daily or every 8 hours:

1. Check the engine oil level
2. Check the radiator coolant level
3. Check the hydraulic oil level
4. Lubricate the points to be lubricated daily
5. Clean the coolers and the grille
6. Check the tyre air pressure visually
7. Check for any fluid and oil leakage
8. Check the connections

Weekly or every 50 hours:

1. Lubricate all the points specified in the lubrication table

Every 100 hours:

1. Clean the engine air filter (*)
2. Check the battery fluid level
3. Clean the breather area on the oil tank
4. Check the condition of the power transmission equipment
5. Clean the cab air filter
6. Check the gearbox oil level
7. Check the light functions
8. Check the oil level in final drives
9. Drain water out of the water separator
10. Check the brake functions
11. Check the belt tension
12. Clean the windows

(*) or when the blockage indicator alarms

Every 500 hours:

1. Change the engine oil and filter.
2. Check the drive pedal function.
3. Run the additional heater and air conditioning outside the heating season.
4. Replace the hydraulic oil filters after the first 500 operating hours.
5. Check the screw tightness after the first 500 operating hours, particularly in the crane and the joint.
6. Adjust the diesel engine valves after the first 500 operating hours and then every 1000 operating hours.

Every 1000 hours:

1. Change the fuel filter (*)
2. Change the fuel pre-filter (waterseparator (*)
3. Drain condensed water out of the fuel tank minimum once a year
4. Change the oil in the crane turning motor
5. Change the hydraulic filters (**)
6. Change the gearbox oil
7. Check the hydraulic hoses. Replace the hoses at least every 15 years.
8. Check the radiator and engine air hoses visually, replace if necessary.
9. Change the engine cooling water hoses at least every five years.
10. Adjust the engine valves

(*) or when indicated by service code in the engine system
(**) or when the blockage indicator alarms

Every 1500 hours:

1. Change the oil in final drives
2. Change the hydraulic oil
3. Check the signal light functions

Every 2000 hours

1. Inspect and clean diesel engine injectors (EEM3 service tool)

Every 4000 hours

1. Inspect compressor clearances / check the cleanliness of the intercooler

Every 6 months:

1. Service the fire extinguisher

Every 1 year:

1. Check/ service of the automatic fire extinguishing system

Every 2 years:

1. Replace the AC drying cartridge
2. Change the engine coolant

Storage when not in use

In case of a longer storage, the pre-storage service is recommended . The pre-storage service can be divided into three parts, in order of performance: cleaning, checking and protection.

Cleaning:

Dirt is efficiently removed from a dry harvester by compressed air. A high-pressure washer may also be used with caution. To reduce drying time, use warm water. Do not direct water jets at the bearings, as the packing does not hold against a strong spray of water. Apply suitable solvent on heavily greasy spots before washing. Start cleaning from the top. Clean the radiator cells by blowing air from the direction of the wings.

Checking:

Take a pen and paper and write down all the shortcomings and required service measures in the following order:

- Condition of the harvester head
- Bearing clearances and attachments
- Wear, corrosion and dents

It is important to have the recorded defects repaired before storage to ensure the efficient functioning of the harvester in the future.

Protection:

Use engine oil or special protective oil in a sprayer.

Places to be protected:

- Scratched paintwork (paint)
- Electrical connections (special protective spray)

Cab ventilation:

Clean the filters. Clean the air channels and the fan unit with its cells. This may be done with a vacuum cleaner.

Air Conditioning:

Clean the air conditioner condenser and vaporiser cells preferably with compressed air.

Engine:

Clean the engine externally.
Replace the fuel filter.
Change the engine oils.
Replace the engine oil filter.
Check the anti-freezing quality of the coolant.
Clean or replace the air filter.
Clean the cable lugs and apply grease to them.

Electrical instruments:

Clean the battery surfaces, check the fluid level and charge the battery full. Charge the battery every three months.

Recommended tools and accessories

Recommended accessories

- Pulse sensors
- Inductive sensors
- Light bulbs
- Connection relays
- Gaskets and packing

For the saw

- Chains
- Spare guide bar

General Parts

- Hexagonal screws M6-M12, the most common lengths of 16-40 mm, strength class min. 8.8.
- Hexagonal nuts M6-M12, strength class 8. A few lock nuts.
- Washers and spring washers, 6.5-13 mm.
- Spring cotters, 3-8 mm, lengths 20-50 mm.
- Grease nipples 6 mm and 1/8”, straight and angled.
- Fuses 7.5; 10, 15; 25; 40A

Battery

The gas generated by the battery is very explosive. Avoid open fire and sparks in the vicinity of the battery.
When servicing an electrical instrument, disconnect the negative cable of the battery.

Checking of the charge state of the battery

During harvesting the engine recharging equipment keeps the battery charged. At other times, check the state of the battery at regular intervals and recharge if necessary. An acid gauge may be used for checking. In the table below you can see the charge state of the battery compared with the acid specific weight.

Specific weight reading	Charge state
1 280	Fully charged
1 240	75 % ”
1 200	50 % ”
1 160	25 % ”
1 120	No charge

Do not leave a flat battery unused for a long time. A low-charged battery freezes easily and exposure to frost will cause extensive damage. If a recharging device is available, recharging can also be done at home.
Before starting to recharge:
Disconnect the battery cables.
Unplug the cells.
Make sure the fluid level is high enough.
Use 5-10 % of the Ah of the battery for charging current. For example: A 100 Ah battery may be recharged using 5-10 ampere current. Recommended recharging interval is 6-10 weeks.

Cleaning of battery and other maintenance

Clean the battery cover regularly.
Remove any oxidisation off the battery poles and cable lugs.
Make sure the cable lugs are properly tightened.
Coat the outer faces of the poles and lugs with Vaseline. Check that the battery is properly fastened and the poles protected. Make sure the rubber rug on the battery is properly adjusted.
Check the fluid level a few times a year and before storage. Add distilled water, if necessary, up to the upper fluid level.
NOTE! Wrong connection of either the battery or the generator will damage the generator.
Before electrical welding, disconnect the battery and generator cables.
Check the condition of the cable insulation and the protective cables on a regular bases and perform any necessary repairs.

Using of auxiliary battery

If additional power is needed for starting, proceed as follows:

As a source of additional power use 24 V input for example: another 24V vehicle, startbooster or two 12V batteries in series. Make sure the harvester batteries has not frozen; a flat battery freezes in -10°C.

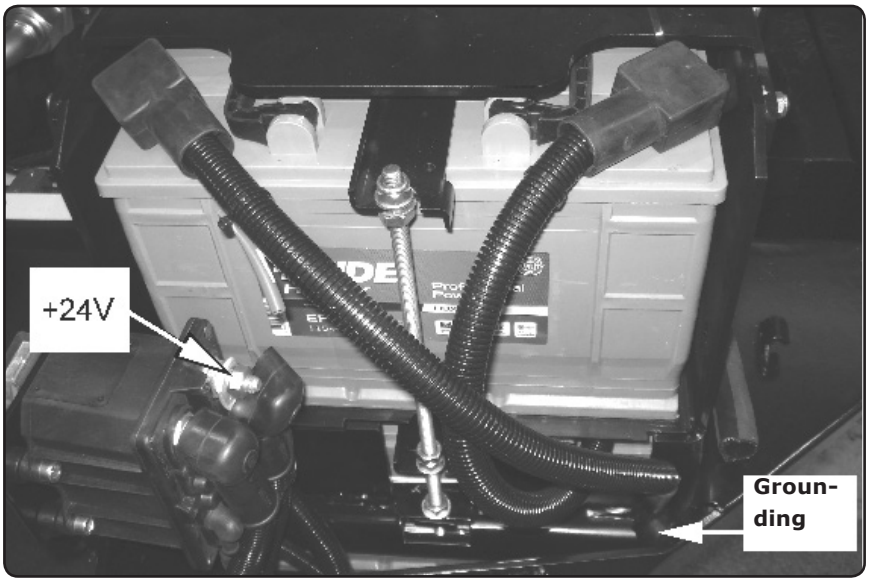
Follow carefully the connecting sequence given below:
1. Connect the auxiliary starting cable to the positive pole of the additional power source. Connect other end of the cable to the 30-pole of the main switch (that is +24V cable from harvester batteries fig.49).
2. Connect one end of another auxiliary starting cable to the frame of the harvester (same point where batteries grounding is located fig.49). Connect the last end to the negative pole of the additional power source.

Do not lean over the batteries while making the connections.
Start the engine.
Disconnect the cables in exactly the opposite order.

Installation of Additional Electrical Instruments

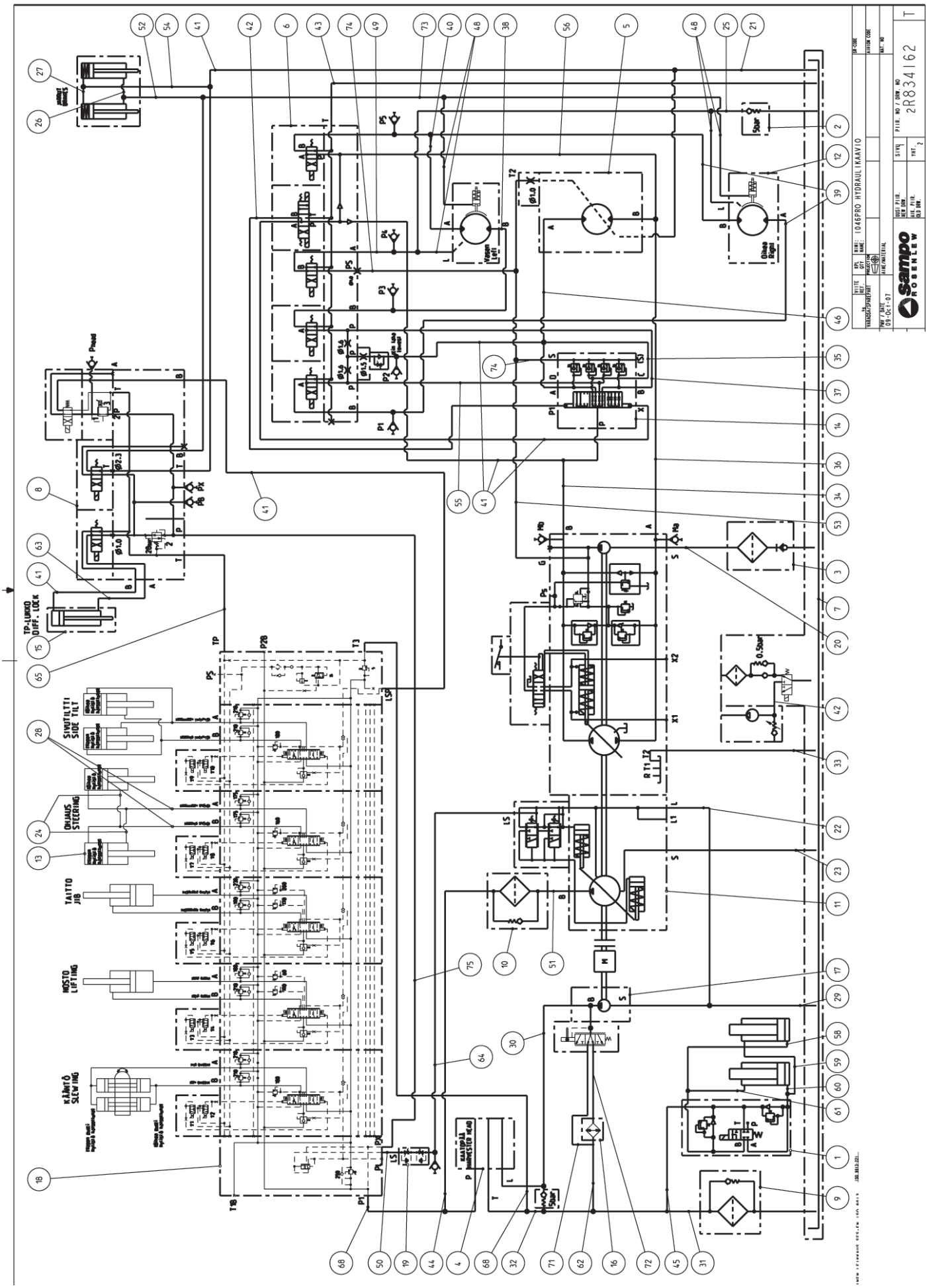
When installing additional electrical instruments to the harvester, make sure the size of the charge generator is 100 A. The total consumption of a basic forest harvester in the dark is 70-90 A consisting mainly of the following:

Headlights	6 A
Working lights	40 A
Gauge lights approx.	1 A
Three-speed cab fan	7 A
Harvesting computer	7 A
Hydraulics	8 A
Joystick functions approx.	3 A



49

Hydraulic diagram



Hydraulic diagram part catalogue SR1046 pro

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74	2	PRESSURE LINE HOSE	0451872
73	1	PRESSURE LINE HOSE	0450834
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71	1	TANK LINE HOSE	0451908
70	1	PRESSURE LINE HOSE	0450531
69	1	PRESSURE LINE HOSE	0450539
68	2	PRESSURE LINE HOSE	0450503
67			
66			
65	1	PRESSURE LINE HOSE	0450541
64	1	PRESSURE LINE HOSE	0450505
63	1	TANK LINE HOSE	0450543
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61	1	PRESSURE LINE HOSE	0450880
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57			
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55	1	PRESSURE LINE HOSE	0450838
54	1	TANK LINE HOSE	0450599
53	1	PRESSURE LINE HOSE	0450542

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50	3	PRESSURE LINE HOSE	0450539
49	1	TANK LINE HOSE	0450545
48	4	TANK LINE HOSE	0450841
47			
46	1	PRESSURE LINE HOSE	0451857
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44	1	PRESSURE LINE HOSE	0450536
43	1	TANK LINE HOSE	0450535
42	3	PRESSURE LINE HOSE	0450532
41	6	PRESSURE LINE HOSE	0450531
40	1	PRESSURE LINE HOSE	0450840
39	2	PRESSURE LINE HOSE	0450839
38	1	PRESSURE LINE HOSE	0450837
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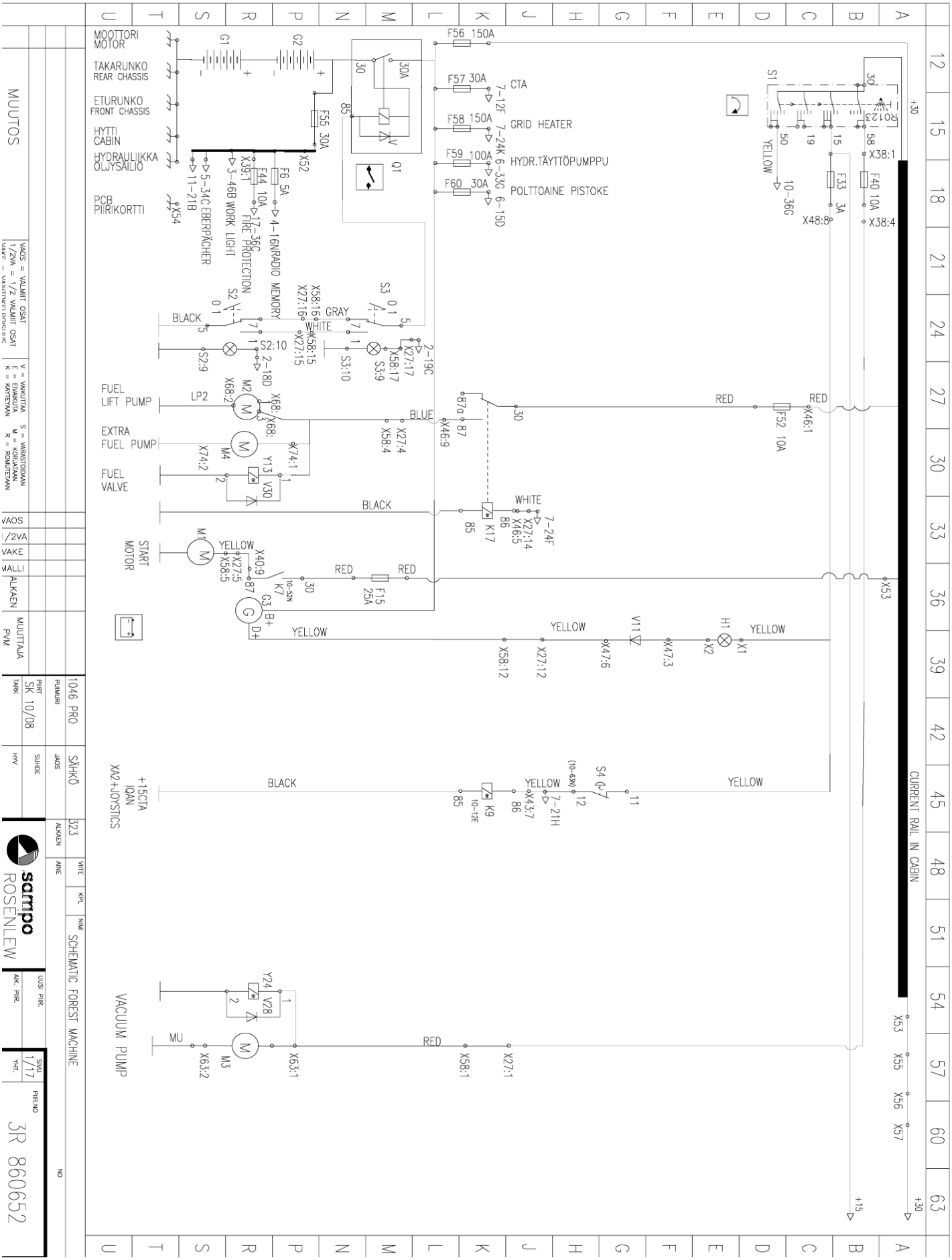
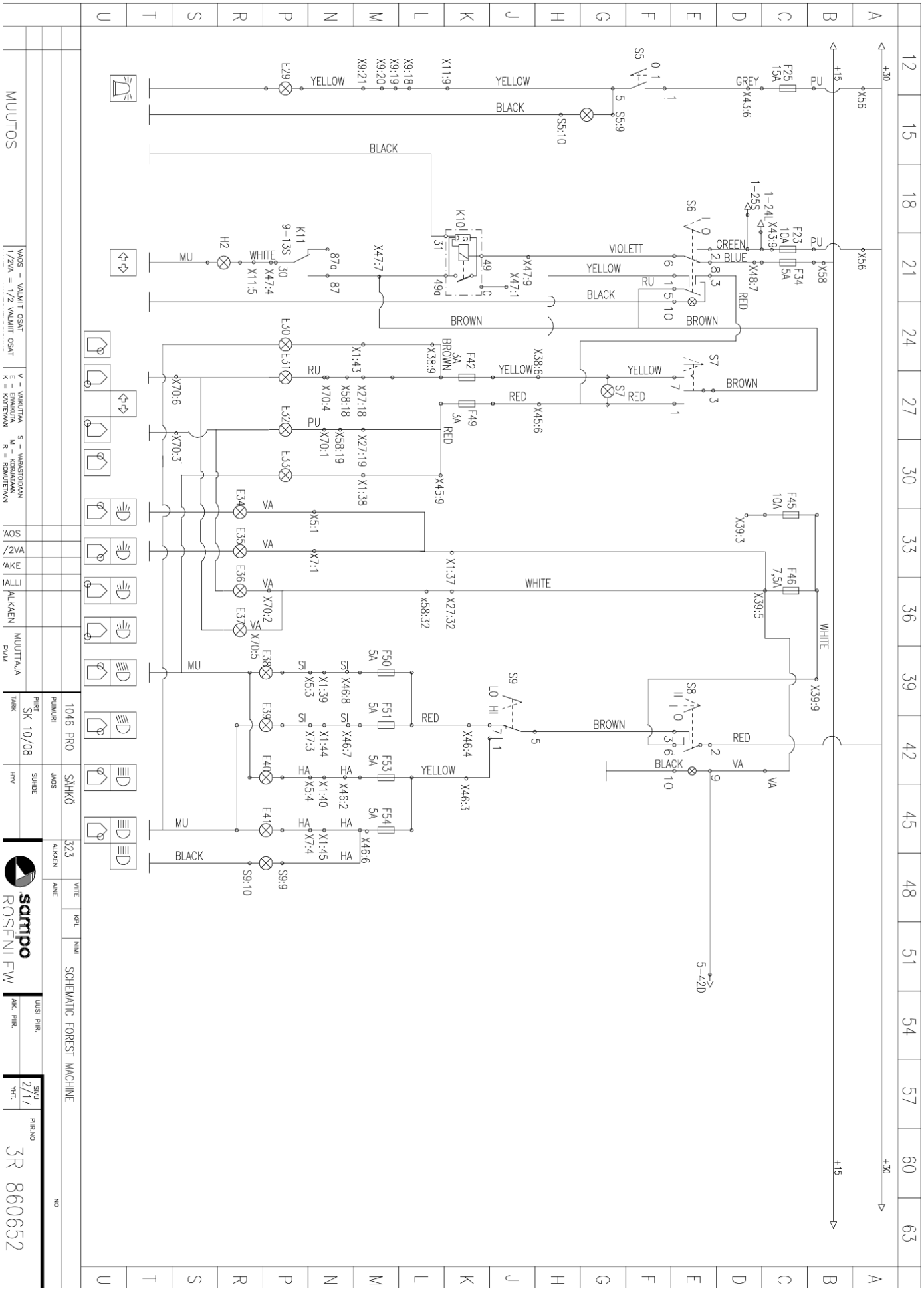
32	1	TANK LINE HOSE	0451858
31	1	TANK LINE HOSE	0450519
30	1	PRESSURE LINE HOSE	0451863
29	1	SUCTION LINE HOSE	0451864
28	2	PRESSURE LINE HOSE	0450514
27	1	PRESSURE LINE HOSE	0450594
26	1	PRESSURE LINE HOSE	0450181
25	1	TANK LINE HOSE	0450163
24	2	PRESSURE LINE HOSE	0450595
23	1	SUCTION LINE HOSE	0450583
22	1	TANK LINE HOSE	0450582
21	1	TANK LINE HOSE	0450135
20	1	SUCTION LINE HOSE	0450842
19	1	LS-LINE ORIFICES	R857429
18	1	CRANE VALVE	R860112
16	1	OIL COOLING	R857444
15	1	DIFF.LOCK	R855067
14	1	FLOW DIVIDER VALVE	R855065
13	1	STEERING CYLINDERS	R855063
12	2	HYDRAULIC MOTOR 4WD	R857406
11	1	WORK PUMP	R855260
10	1	PRESSURE FILTER	R855060
9	1	RETURN FILTER	R857446
8	1	VALVE BLOCK BRAKES DIFF.LOCK, PUMP PRESS.	R857426
7	1	OIL TANK	R857445
6	1	VALVE BLOCK 4WD	R855051
5	1	HYDRAULIC MOTOR FRONT	R855262
4	1	HARVESTER HEAD	R833872
3	1	SUCTION FILTER	R833868
2	1	CHECK VALVE	R833867
1	1	FRAME LOCK CYLINDERS	R857209

Electric diagram

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1046 PRO
SÄHKÖ
3R 860652
SIVU 2/17
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+15
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S6
S7
S8
S9
K10
K11
H2
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E30
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E39
E40
E41
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F25 15A
F34
F42 3A
F45 10A
F46 7,5A
F49 3A
F50 5A
F51 5A
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F54 5A
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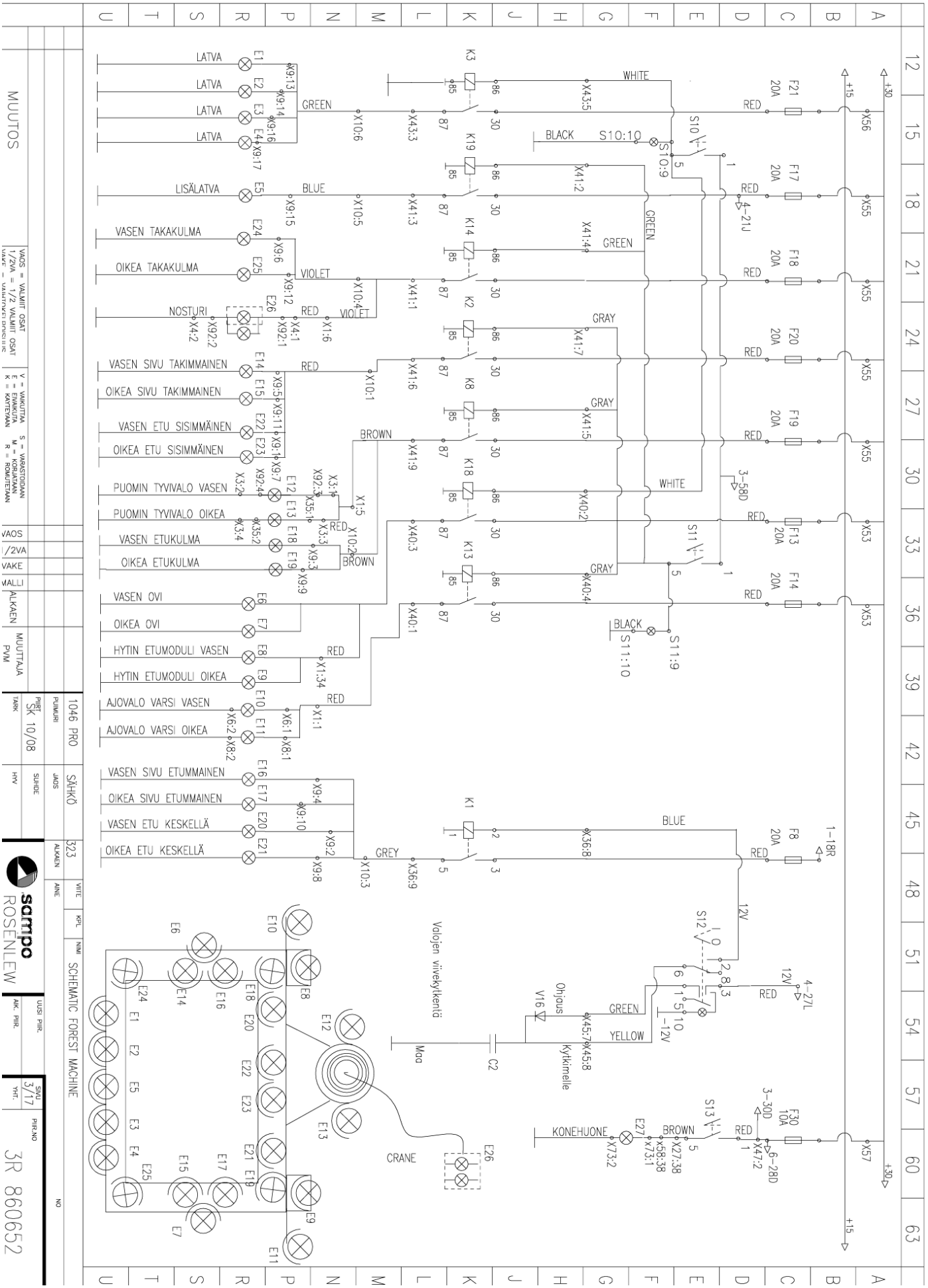
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NOSTURI
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VASEN ETU SISIMMÄINEN
OIKEA ETU SISIMMÄINEN
PUOMIN TYVIVALO VASEN
PUOMIN TYVIVALO OIKEA
VASEN ETUKULMA
OIKEA ETUKULMA
VASEN OVI
OIKEA OVI
HYTIN ETUMODULI VASEN
HYTIN ETUMODULI OIKEA
AJOVALO VARSI VASEN
AJOVALO VARSI OIKEA
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GREY
Valojen viivekytkentä
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CRANE
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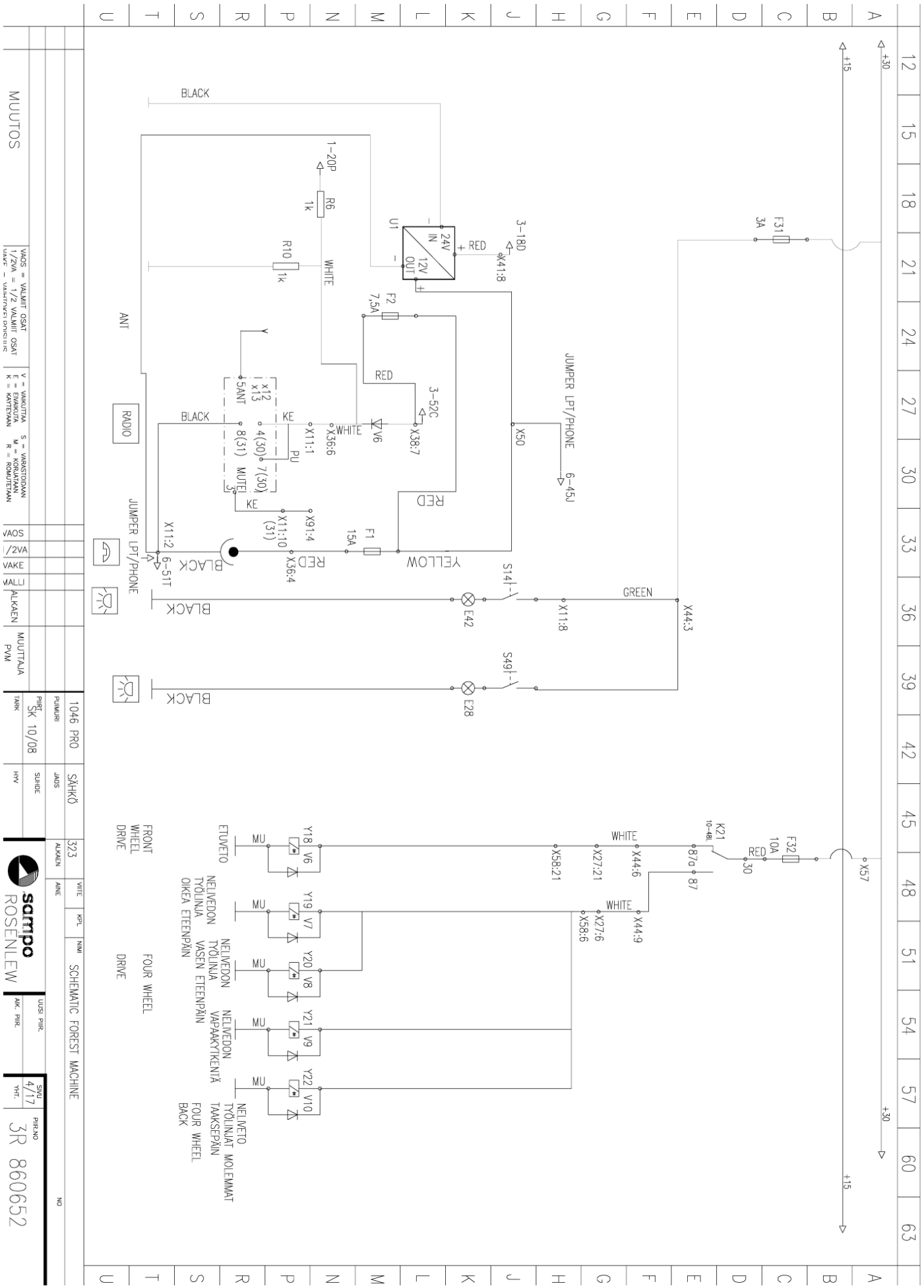
SCHEMATIC FOREST MACHINE
SÄHKÖ
1046 PRO
3R 860652


MUUTOS
SCHEMATIC FOREST MACHINE
sampo ROSENLEW
3R 860652
1046 PRO
SÄHKÖ
323
SK 10/08
BLACK
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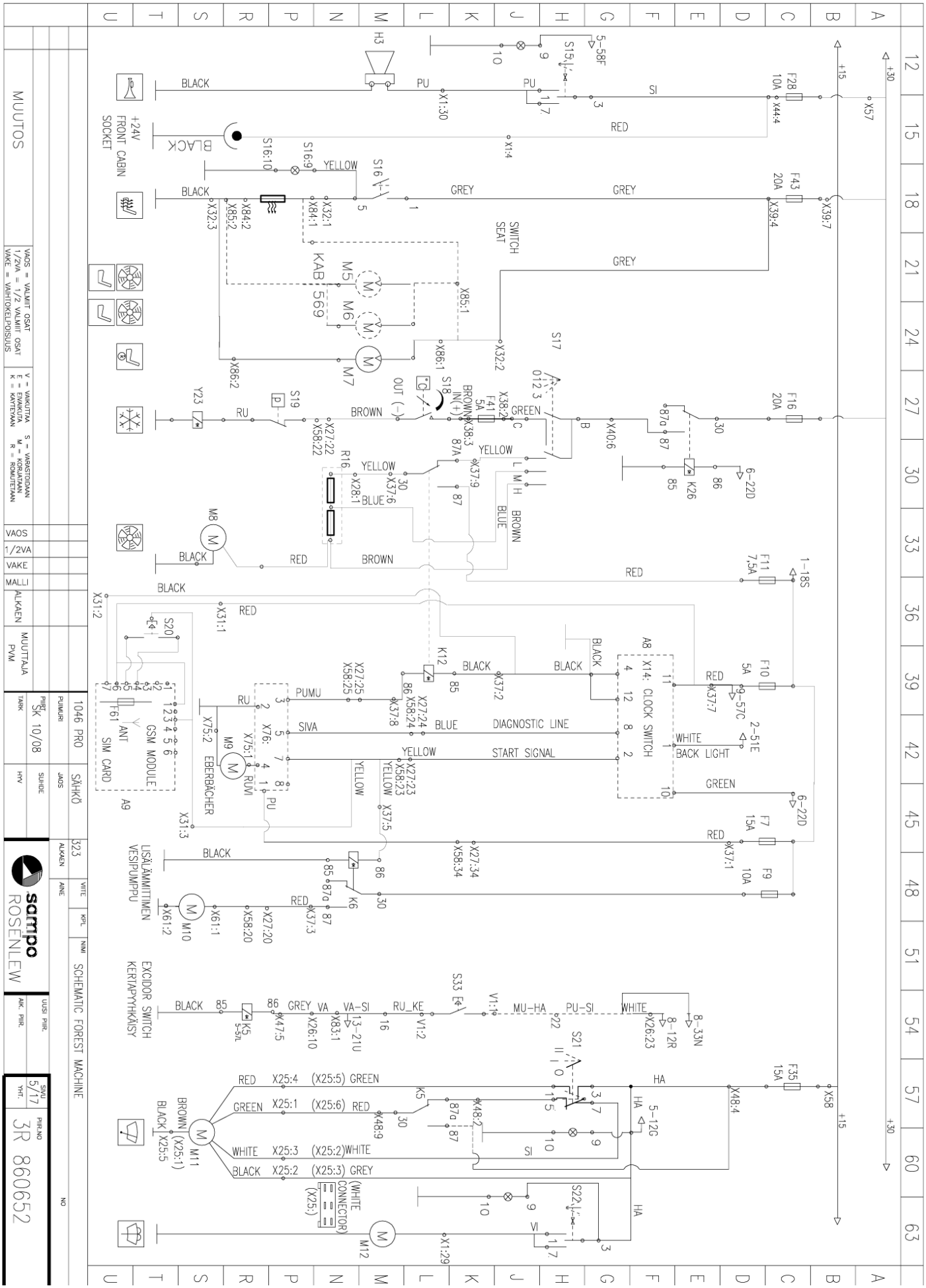
WHITE
GREEN
YELLOW
BLUE
RADIO
ANT
JUMPER LPT/PHONE
FRONT WHEEL DRIVE
FOUR WHEEL DRIVE
ETUVETO
NELIVEDON TYÖLINJA OIKEA ETEENPÄIN
NELIVEDON TYÖLINJA VASEN ETEENPÄIN
NELIVEDON VAPAAKYTKENTÄ
NELIVETO TYÖLINJAT MOLEMMAT TAAKSEPÄIN
FOUR WHEEL BACK


SCHEMATIC FOREST MACHINE
3R 860652
1046 PRO
SÄHKÖ
SAMPO ROSENLEW
MUUTOS
MUUTTAJA
PVM
ALKAEN
MALLI
VAKE
1/2VA
VAOS
VAOS = VALMIIT OSAT
1/2VA = 1/2 VALMIIT OSAT
VAKE = VAIHTOKELPOISUUS
V = VAIKUTTAA
E = EIVAIKUTA
K = KAYTETAAN
S = VARASTOIDAAN
M = KORJATAAN
R = ROMUTETAAN
PIIR. TARK
PIIRUSK 10/08
PIIRUMURI
JAOS
SUUNNITTELIJA
HYV
323
ALKAEN
ANE
VIITE
KPL
NIMI
AIK.
PIIR.
UUSI PIIRR.
SIVU
5/17
YHT.
PIIR.NO
NO
+30
+15
+24V FRONT CABIN SOCKET
SWITCH SEAT
EXCIDOR SWITCH KERTAPYYHKÄISY
LISÄLÄMMITTIMEN VESIPUMPPU
GSM MODULE
SIM CARD
EBERBÄCHER
DIAGNOSTIC LINE
START SIGNAL
BACK LIGHT
CLOCK SWITCH
CONNECTOR
F28 10A
F43 20A
F16 20A
F11 7.5A
F10 5A
F7 15A
F9 10A
F35 15A
K26
K12
K6
K5
M5
M6
M7
M8
M9
M10
M11
M12
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YELLOW
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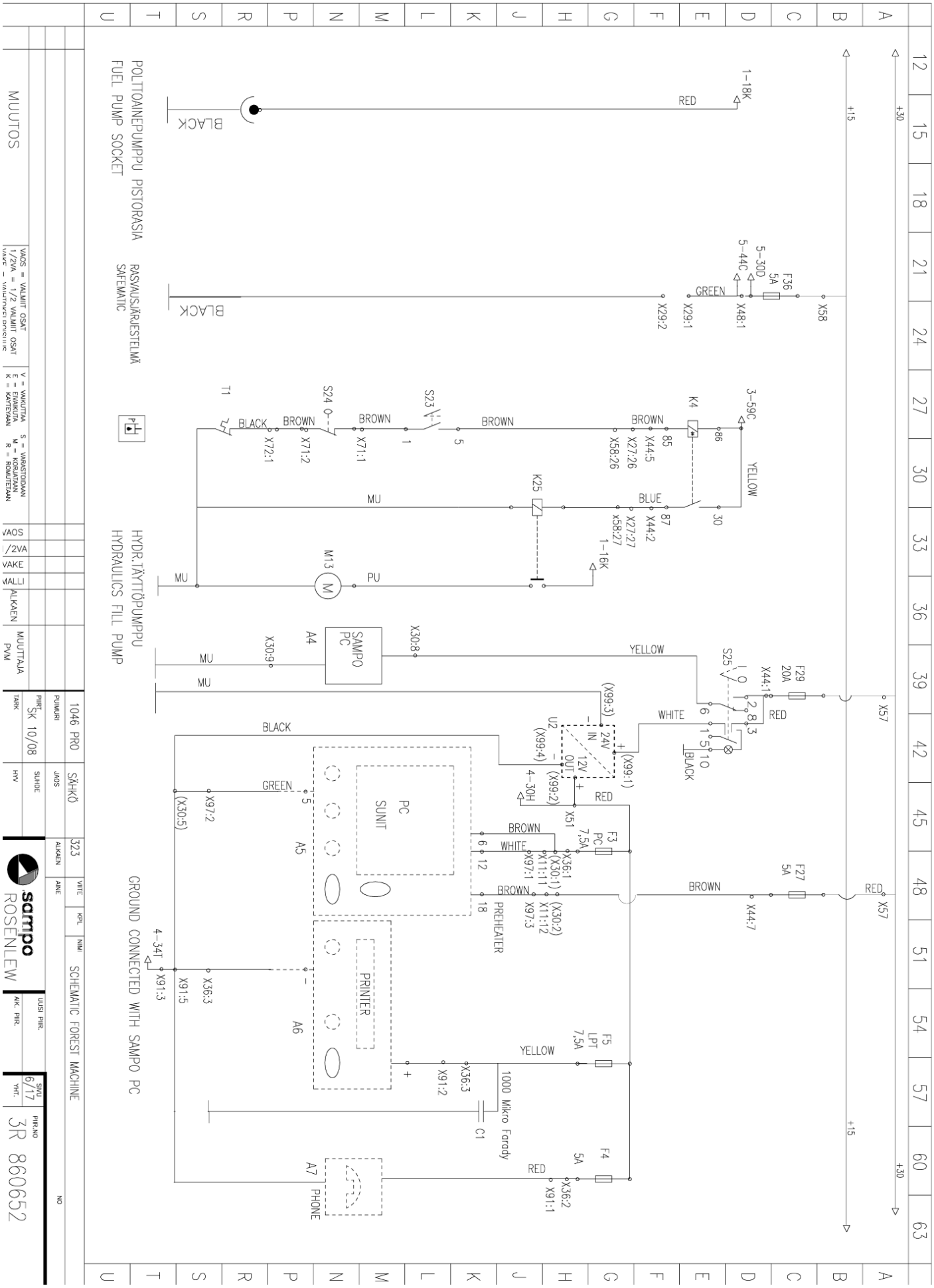
MU-HA
PU-SI


POLTTOAINEPUMPPU PISTORASIA
FUEL PUMP SOCKET
RASVAUSJÄRJESTELMÄ
SAFEMATIC
HYDR.TÄYTTÖPUMPPU
HYDRAULICS FILL PUMP
GROUND CONNECTED WITH SAMPO PC
SCHEMATIC FOREST MACHINE
SAMPO ROSENLEW
1046 PRO
SÄHKÖ
323
SK 10/08
3R 860652
PIIR.NO
SIVU 6/17
YHT.
MUUTOS
MUUTTAJA PVM
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VAKE
/2VA
VAOS
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+30
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GREEN
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5-44C
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X29:2
X48:1
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S23
K4
3-59C
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X72:2
X71:1
X71:2
X58:26
X27:26
X44:5
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86
30
87
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MU
PU
M13
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SAMPO PC
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24V
12V
OUT
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X36:1
(X30:1)
X11:11
X97:1
X97:2
(X30:5)
A5
PC SUNIT
PREHEATER
X97:3
(X30:2)
X11:12
F27 5A
X44:7
4-34T
X91:3
X36:3
X91:5
A6
PRINTER
F5 LPT 7,5A
X91:2
1000 Mikro Farady
C1
F4 5A
X36:2
X91:1
A7
PHONE
VAOS = VALMIIT OSAT
1/2VA = 1/2 VALMIIT OSAT
VAKE = VAKIOTEHTEN EHDOT
V = VAHVISTUS
E = EMÄKUITA
K = KÄYTEVÄAN
S = VARUSTEOMAN
M = KORJATAAN
R = ROMUTETAAN
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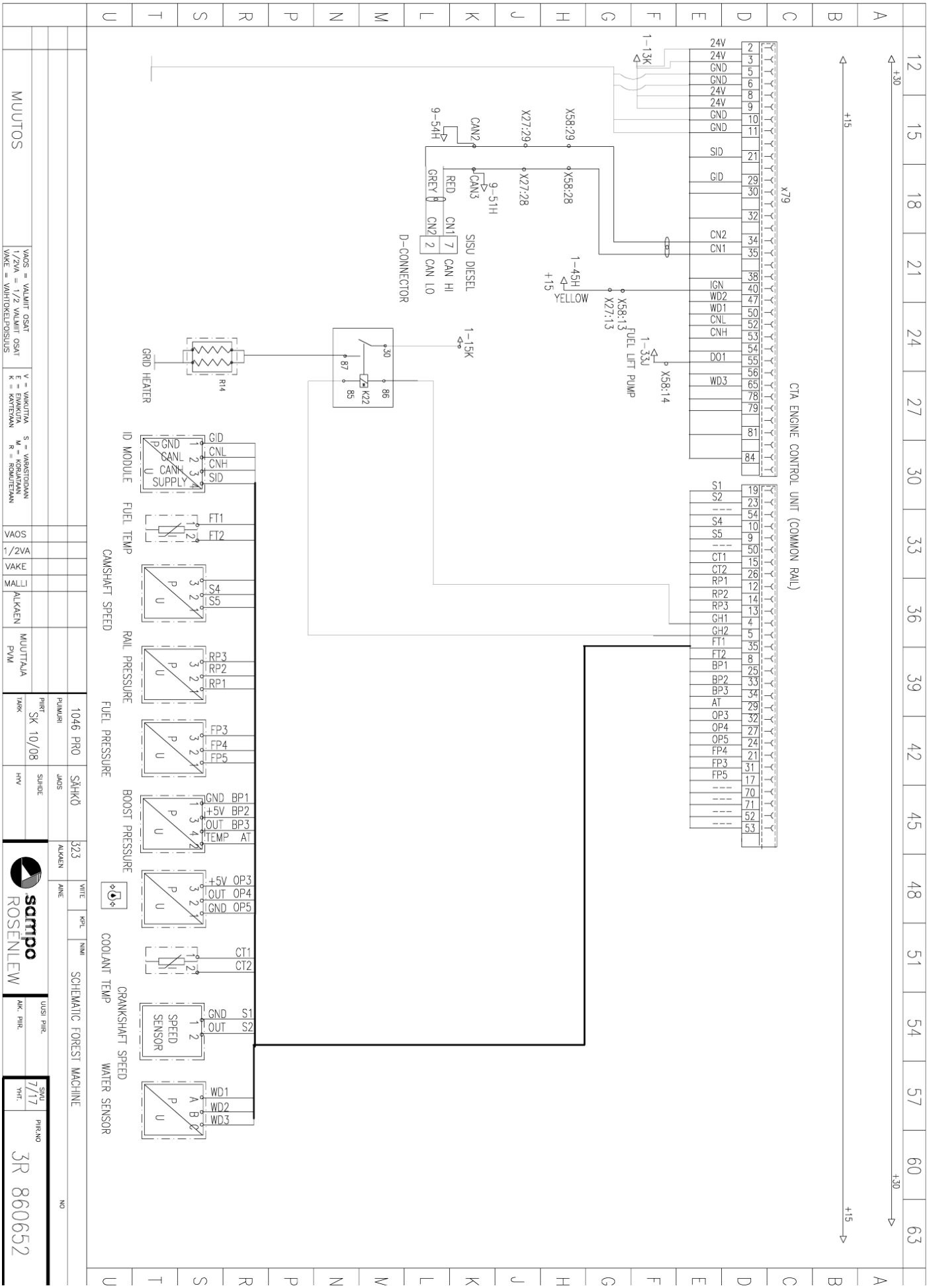
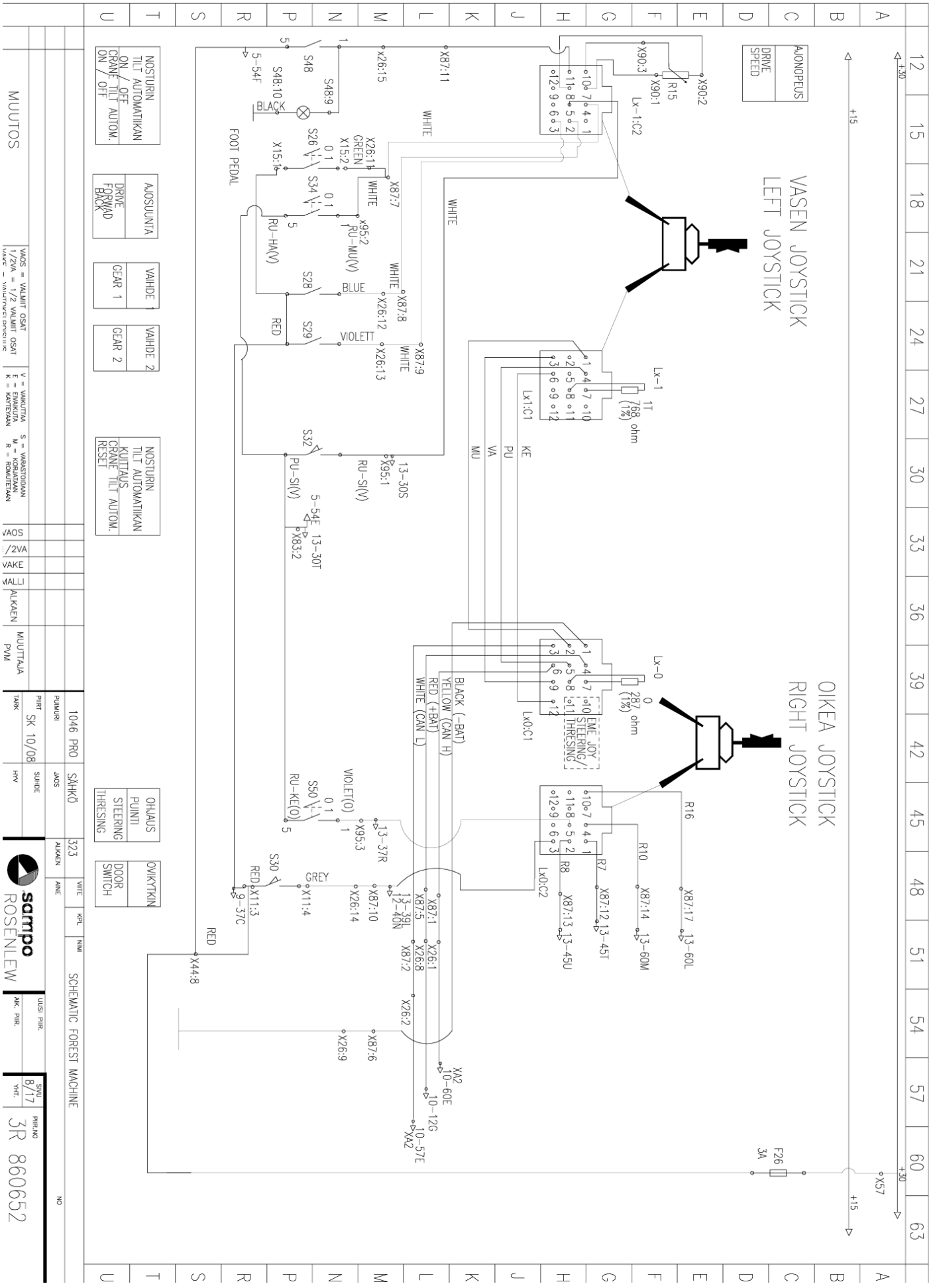
AIK. PIIR.
UUSI PIIR.
NO


CTA ENGINE CONTROL UNIT (COMMON RAIL)
D-CONNECTOR
SISU DIESEL
CAN HI
CAN LO
FUEL LIFT PUMP
GRID HEATER
ID MODULE
FUEL TEMP
CAMSHAFT SPEED
RAIL PRESSURE
FUEL PRESSURE
BOOST PRESSURE
COOLANT TEMP
CRANKSHAFT SPEED
WATER SENSOR
SCHEMATIC FOREST MACHINE
sampo ROSENLEW
3R 860652



MUUTOS

VAOS	1/2VA	VAKE	VALLI	ALKAEN	MUUTTAJA PVM

VAOS = VALMIIT OSAT
1/2VA = 1/2 VALMIIT OSAT
VAKE = VAKUUTETUT ERIKSEEN

V = VANUTTAA
E = ETAKÄYTÄN
K = KÄYTETÄÄN
S = VARASTOIDAAN
M = KORJATTAAN
R = ROMUTETÄÄN

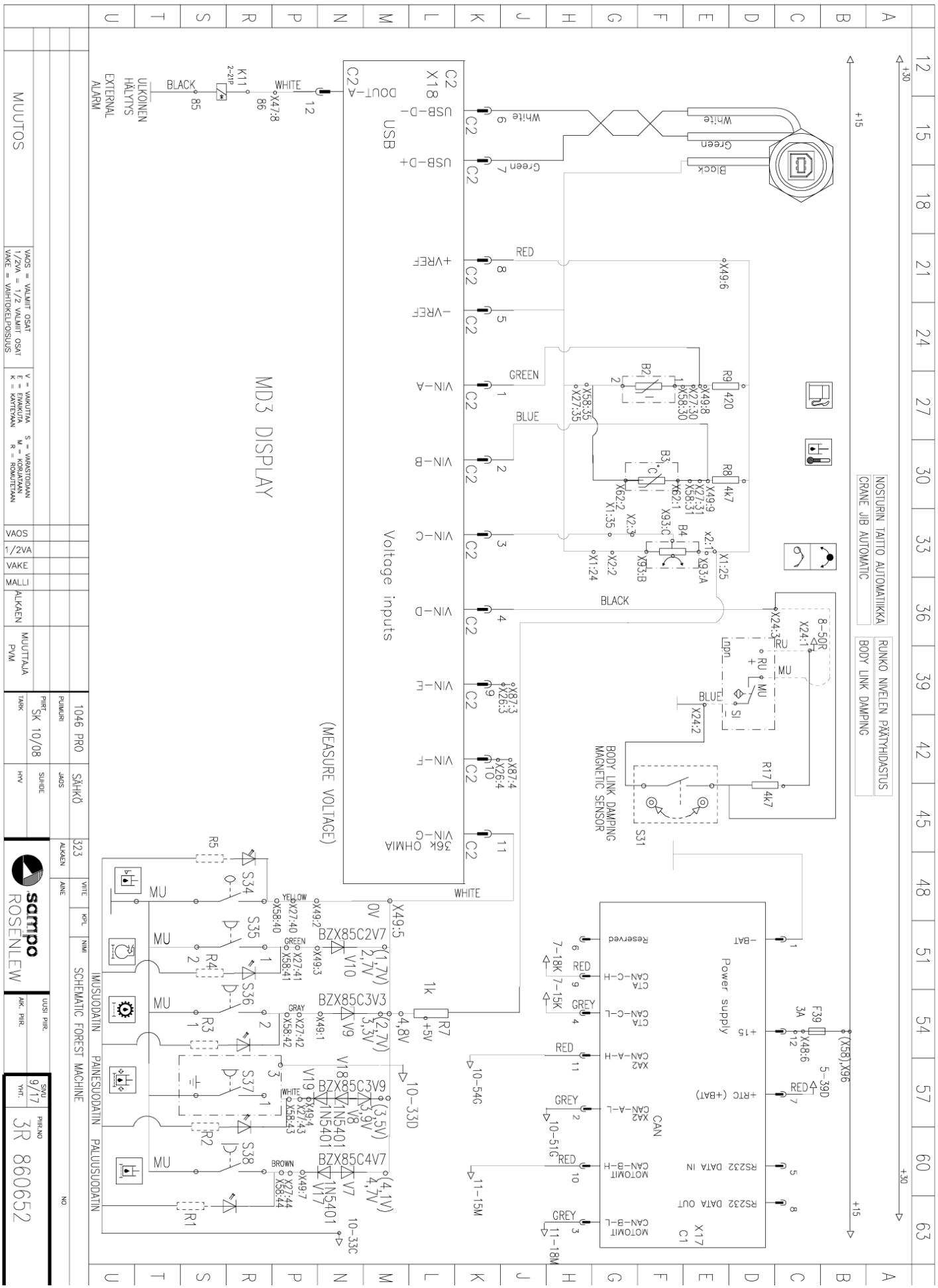
TARK	PIIRT	1046 PRO	SÄHKÖ	323	VRITE
HYV	SUHDE	PUIMURI	JAOS	ALKAEN	AINE

sampo ROSENLEW

SCHEMATIC FOREST MACHINE

UUSI PIIR.	AIK. PIIR.	SIVU 8/17	YHT.	PIIR.NO 3R 860652

NO


MD3 DISPLAY
Voltage inputs
(MEASURE VOLTAGE)
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Power supply
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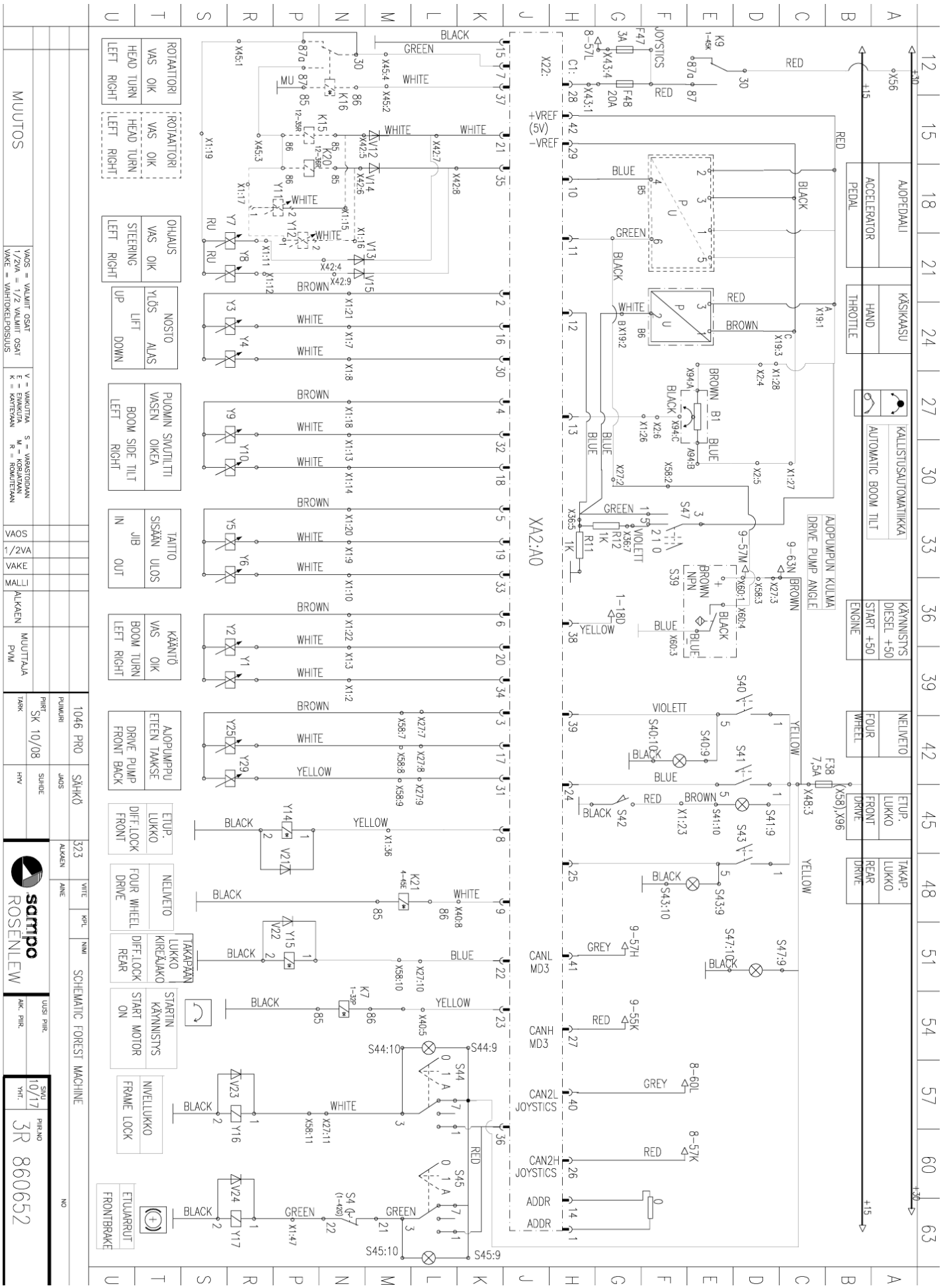
NOSTURIN TAITTO AUTOMATIIKKA
CRANE JIB AUTOMATIC
RUNKO NIVELEN PÄÄTYHIDASTUS
BODY LINK DAMPING
BODY LINK DAMPING MAGNETIC SENSOR
MUUTOS
3R 860652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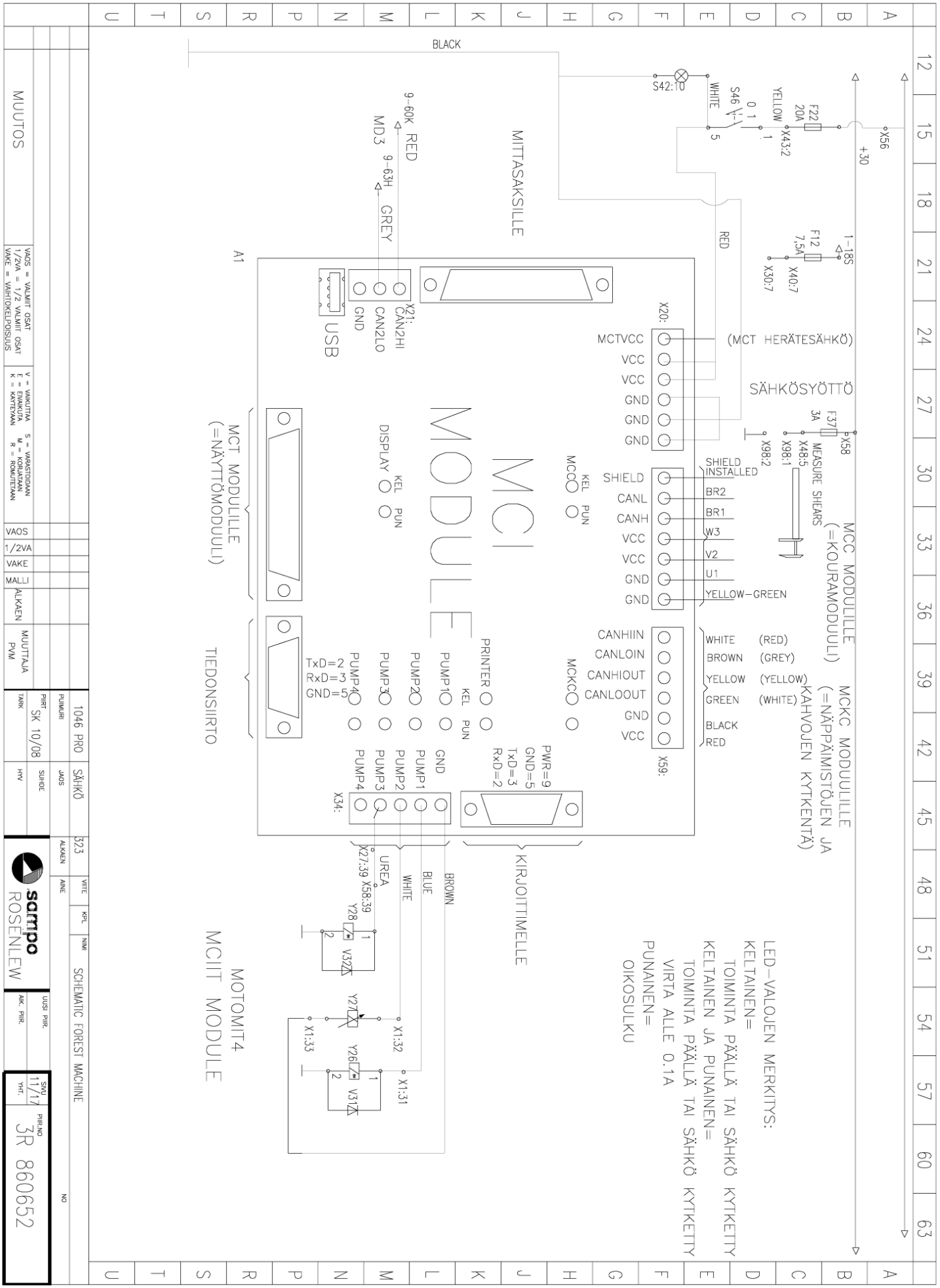
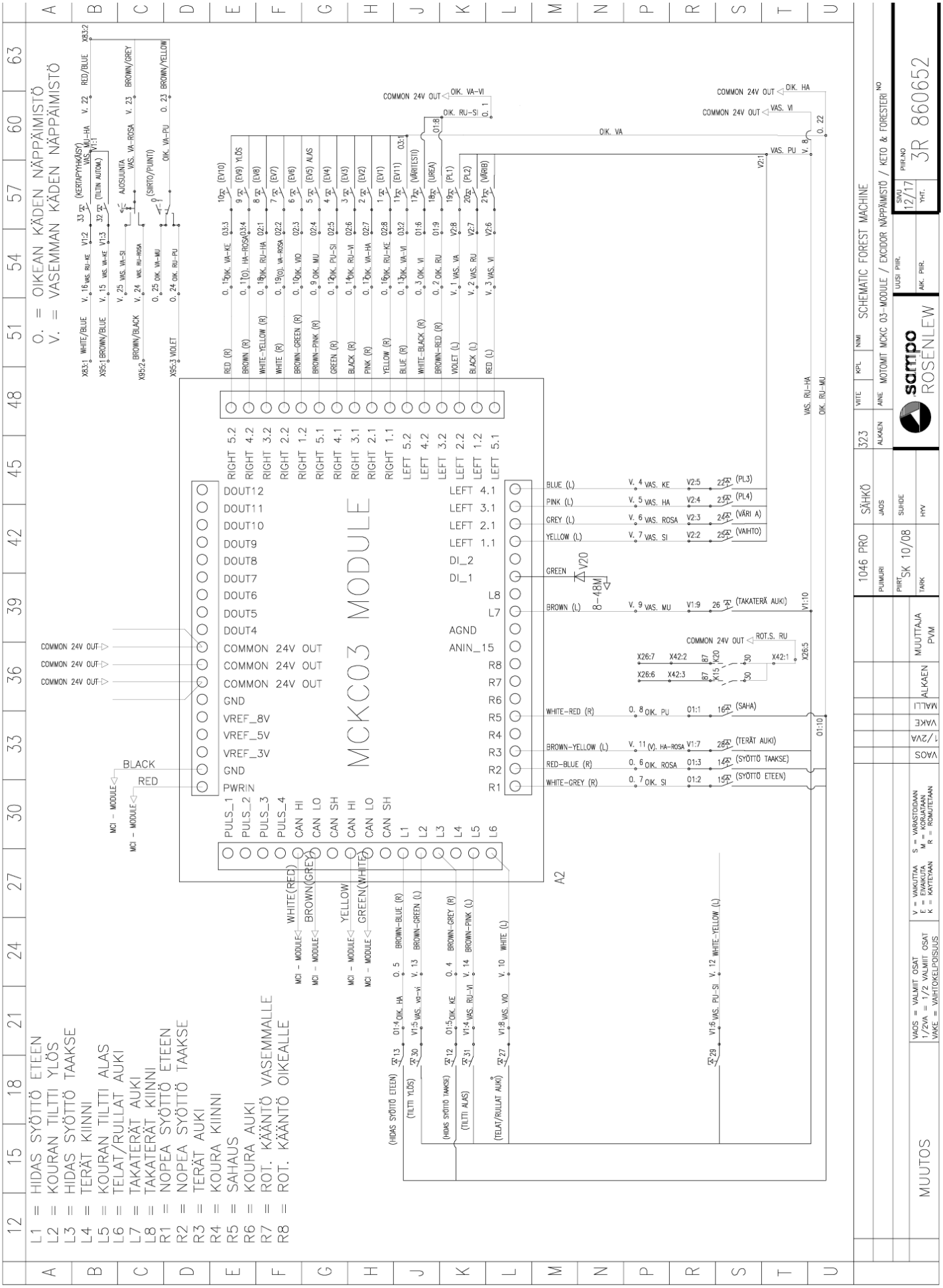
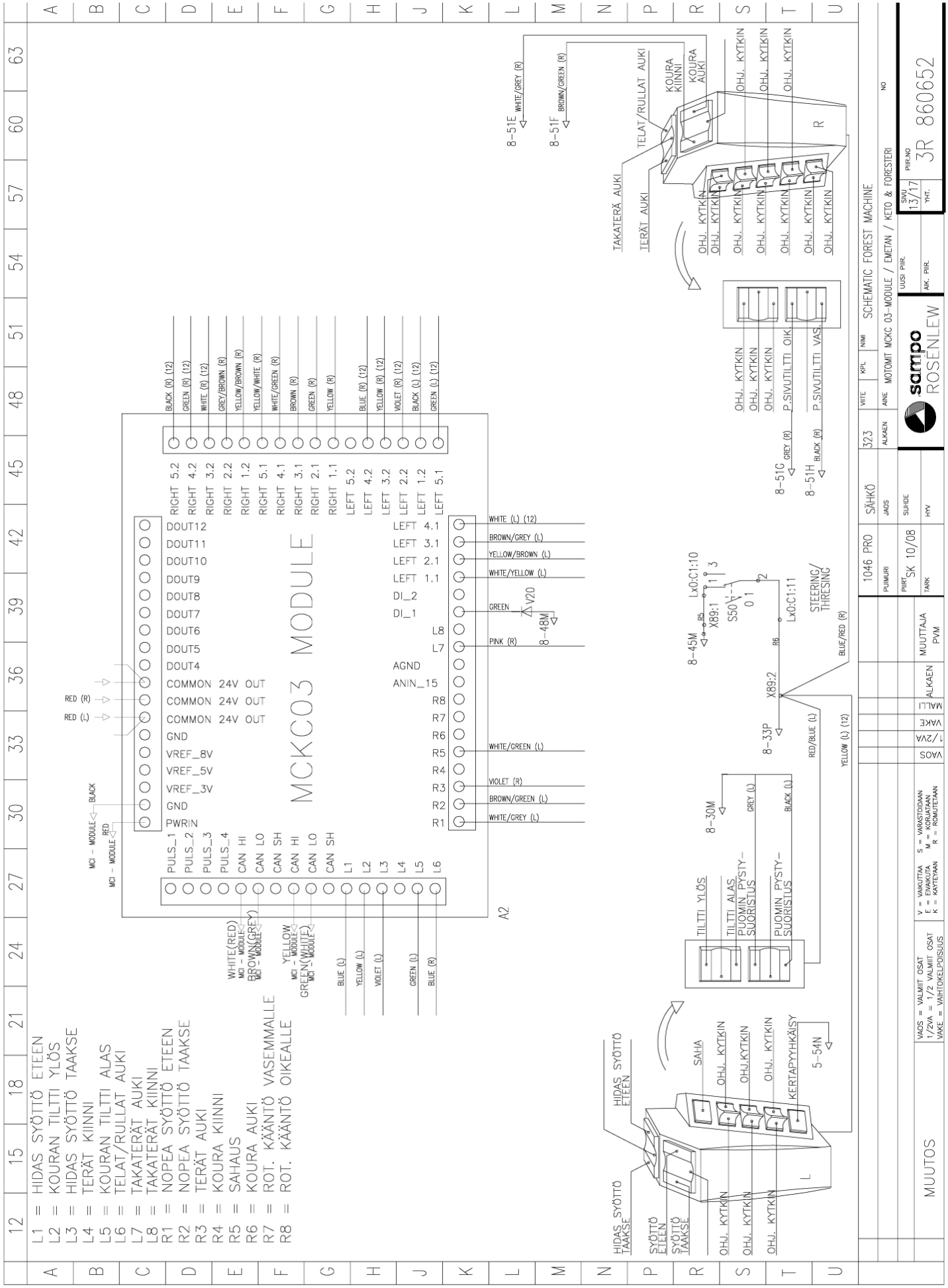
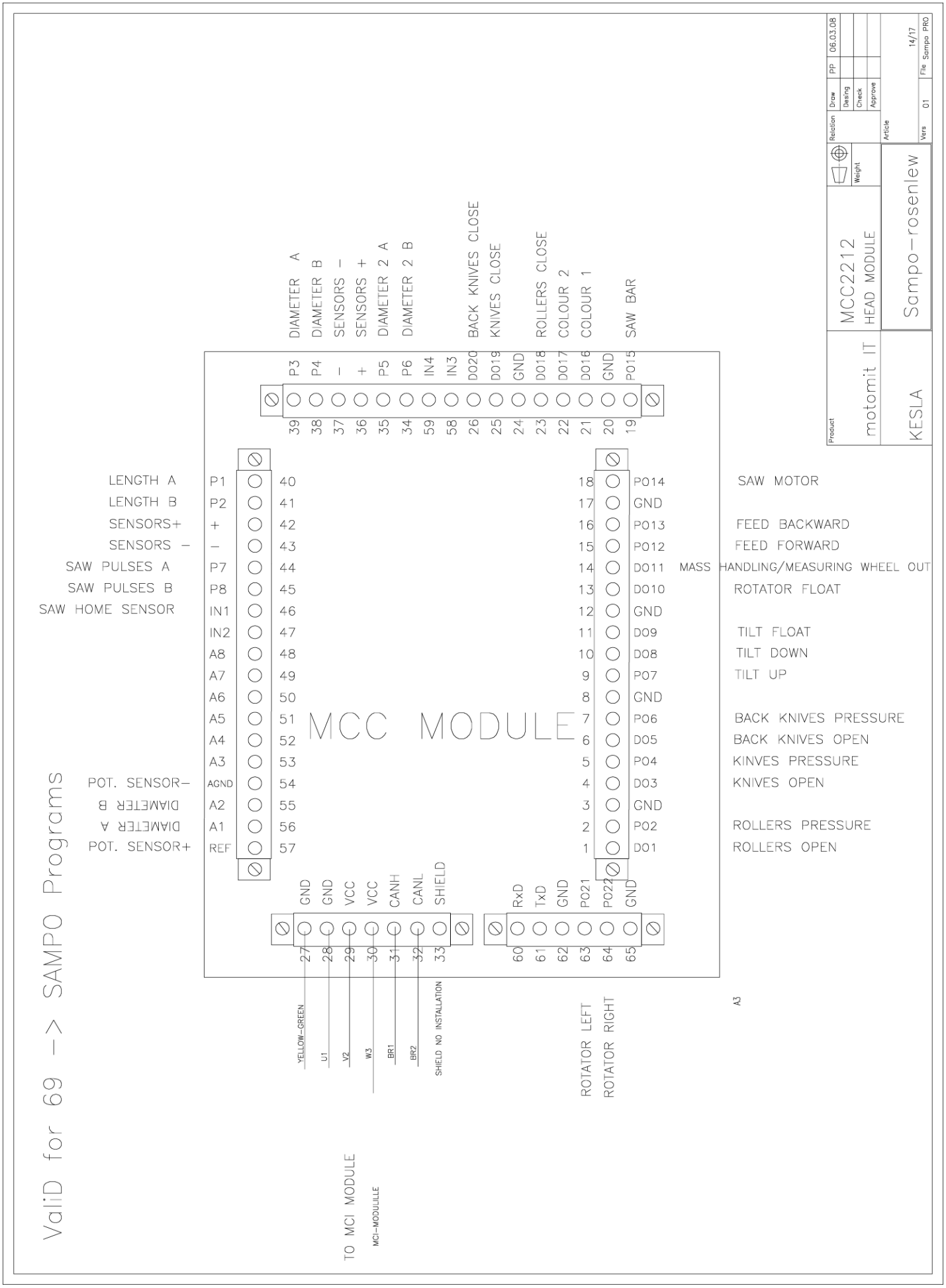
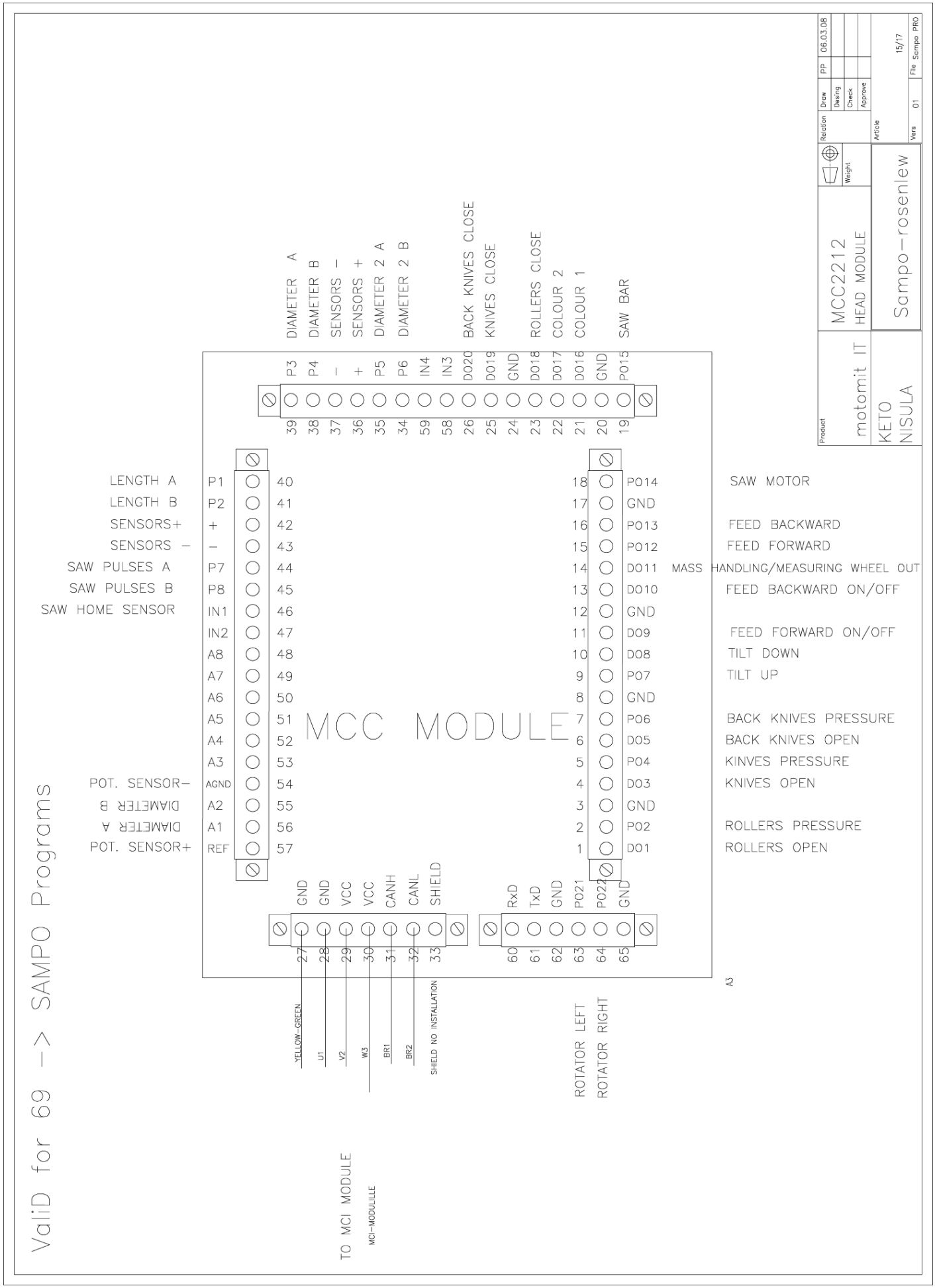
ACCELERATOR PEDAL
KÄSIKAASU
HAND THROTTLE
KALLISTUSAUTOMATIIKKA
AUTOMATIC BOOM TILT
KÄYNNISTYS DIESEL +50
START +50 ENGINE
NELIVETO
FOUR WHEEL DRIVE
ETUP. LUKKO FRONT DRIVE
TAKAP. LUKKO REAR DRIVE
AJOPUMPUN KULMA
DRIVE PUMP ANGLE
ROTAATTORI VAS OIK HEAD TURN LEFT RIGHT
OHJAUS VAS OIK STEERING LEFT RIGHT
NOSTO YLÖS ALAS LIFT UP DOWN
PUOMIN SIVUTILTTI VASEN OIKEA BOOM SIDE TILT LEFT RIGHT
TAITTO SISÄÄN ULOS JIB IN OUT
KÄÄNTÖ VAS OIK BOOM TURN LEFT RIGHT
AJOPUMPPU ETEEN TAAKSE DRIVE PUMP FRONT BACK
ETUP. LUKKO DIFF.LOCK FRONT
NELIVETO FOUR WHEEL DRIVE
TAKAPÄÄN LUKKO KIREÄJAKO DIFF.LOCK REAR
STARTIN KÄYNNISTYS START MOTOR ON
NIVELLUKKO FRAME LOCK
ETUJARRUT FRONTBRAKE
XA2:A0
SCHEMATIC FOREST MACHINE
MUUTOS
VAOS = VALMIT OSAT
1/2VA = 1/2 VALMIT OSAT
VAKE = VAHTOKELPOISUUS
V = VAIKUTTAA
E = EIVAIKUTTA
K = KÄYTETÄÄN
S = VARASTOIDAAN
M = KORJATTAN
R = ROMUTETTAN
VAOS
1/2VA
VAKE
MALLI
ALKAEN
MUUTTAJA PVM
1046 PRO
SÄHKÖ
323
PUIMURI
JADS
SUHDE
SK 10/08
TARK
HYV
VRTE
KPL
NIMI
ANNE
UUSI PIIR.
AIK. PIIR.
SIVU 10/17
YHT.
PIIR.NO 3R 860652
NO

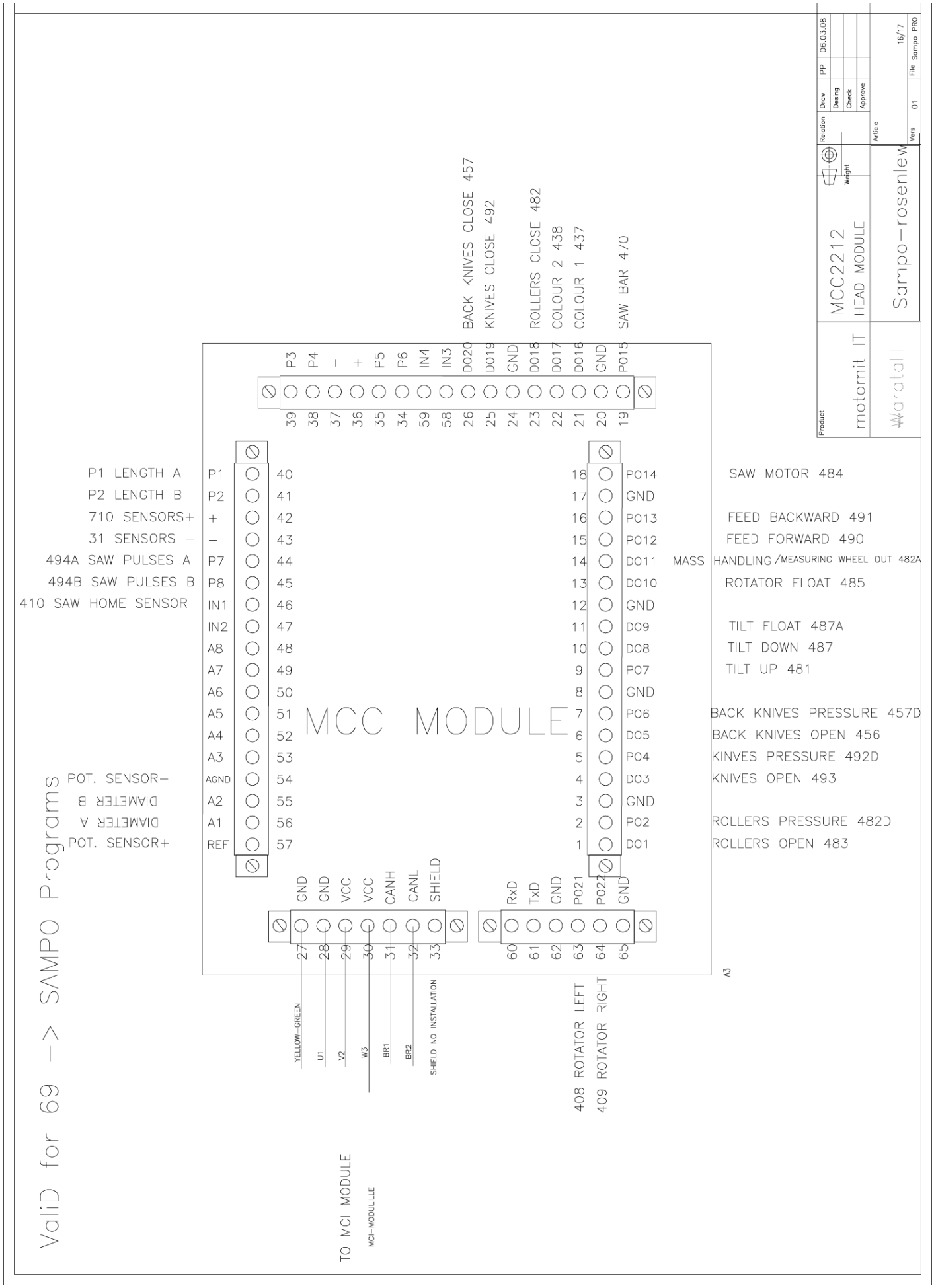

MCI MODULE
MCC MODUULILLE (=KOURAMODUULI)
MCKC MODUULILLE (=NÄPPÄIMISTÖJEN JA KAHVOJEN KYTKENTÄ)
MCT MODULILLE (=NÄYTTÖMODUULI)
MITTASAKSILLE
SÄHKÖSYÖTTÖ
(MCT HERÄTESÄHKÖ)
TIEDONSIIRTO
KIRJOITTIMELLE
MOTOMIT4 MCIIT MODULE
LED-VALOJEN MERKITYS:
KELTAINEN= TOIMINTA PÄÄLLÄ TAI SÄHKÖ KYTKETTY
KELTAINEN JA PUNAINEN= TOIMINTA PÄÄLLÄ TAI SÄHKÖ KYTKETTY VIRTA ALLE 0.1A
PUNAINEN= OIKOSULKU
SCHEMATIC FOREST MACHINE
1046 PRO
SÄHKÖ
323
SK 10/08
MUUTOS
3R 860652

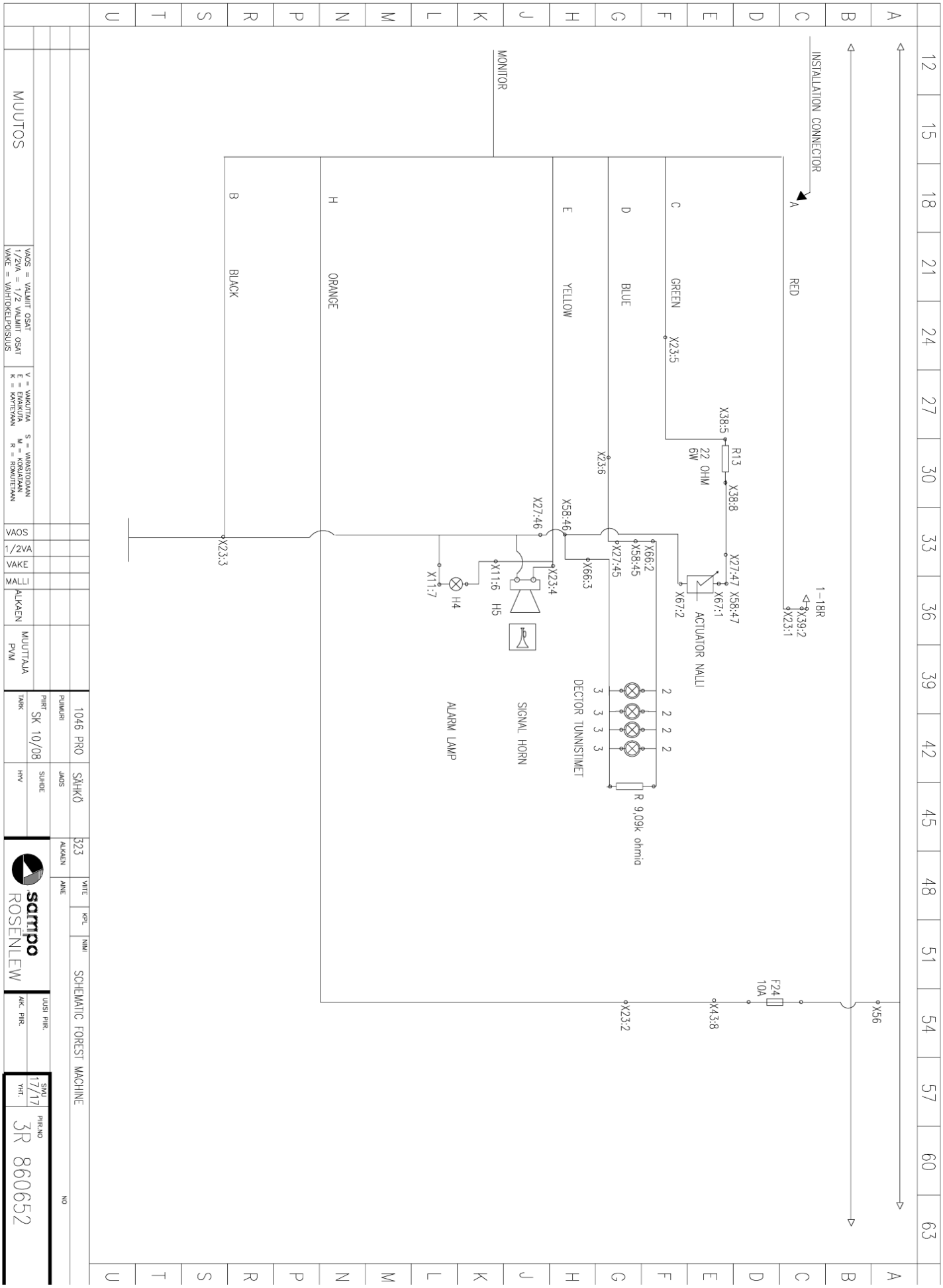

O. = OIKEAN KÄDEN NÄPPÄIMISTÖ
V. = VASEMMAN KÄDEN NÄPPÄIMISTÖ
L1 = HIDAS SYÖTTÖ ETEEN
L2 = KOURAN TILTTI YLÖS
L3 = HIDAS SYÖTTÖ TAAKSE
L4 = TERÄT KIINNI
L5 = KOURAN TILTTI ALAS
L7 = TELAT/RULLAT AUKI
L8 = TAKATERÄT AUKI
R1 = TAKATERÄT KIINNI
R2 = NOPEA SYÖTTÖ ETEEN
R3 = NOPEA SYÖTTÖ TAAKSE
R4 = TERÄT AUKI
R5 = KOURA KIINNI
R6 = SAHAUS
R7 = KOURA AUKI
R8 = ROT. KÄÄNTÖ VASEMMALLE
R7 = ROT. KÄÄNTÖ OIKEALLE
MCKC03 MODULE
A2
SCHEMATIC FOREST MACHINE
MOTOMIT MCKC 03-MODULE / EXCIDOR NÄPPÄIMISTÖ / KETO & FORESTERI
1046 PRO
SÄHKÖ
323
SK 10/08
12/17
3R 860652
sampo ROSENLEW
MUUTOS


L1 = HIDAS SYÖTTÖ ETEEN
L2 = KOURAN TILTTI YLÖS
L3 = HIDAS SYÖTTÖ TAAKSE
L4 = TERÄT KIINNI
L5 = KOURAN TILTTI ALAS
L6 = TELAT/RULLAT AUKI
L7 = TAKATERÄT AUKI
L8 = TAKATERÄT KIINNI
R1 = NOPEA SYÖTTÖ ETEEN
R2 = NOPEA SYÖTTÖ TAAKSE
R3 = TERÄT AUKI
R4 = KOURA KIINNI
R5 = SAHAUS
R6 = KOURA AUKI
R7 = ROT. KÄÄNTÖ VASEMMALLE
R8 = ROT. KÄÄNTÖ OIKEALLE
MCKC03 MODULE
A2
MUUTOS
1046 PRO
SÄHKÖ
323
SCHEMATIC FOREST MACHINE
MOTOMIT MCKC 03-MODULE / EMETAN / KETO & FORESTERI
SK 10/08
3R 860652


Product
KESLA
motomit IT
MCC2212
HEAD MODULE
Sampo–rosenlew
Article
Relation
Weight
Draw
Design
Check
Approve
PP
06.03.08
Vers
01
File Sampo PRO
14/17
MCC MODULE
LENGTH A
LENGTH B
SENSORS+
SENSORS –
SAW PULSES A
SAW PULSES B
SAW HOME SENSOR
POT. SENSOR–
DIAMETER B
DIAMETER A
POT. SENSOR+
DIAMETER A
DIAMETER B
SENSORS –
SENSORS +
DIAMETER 2 A
DIAMETER 2 B
BACK KNIVES CLOSE
KNIVES CLOSE
ROLLERS CLOSE
COLOUR 2
COLOUR 1
SAW BAR
SAW MOTOR
FEED BACKWARD
FEED FORWARD
MASS HANDLING/MEASURING WHEEL OUT
ROTATOR FLOAT
TILT FLOAT
TILT DOWN
TILT UP
BACK KNIVES PRESSURE
BACK KNIVES OPEN
KINVES PRESSURE
KNIVES OPEN
ROLLERS PRESSURE
ROLLERS OPEN
GND
GND
VCC
VCC
CANH
CANL
SHIELD
RxD
TxD
GND
P021
P022
GND
YELLOW–GREEN
U1
V2
W3
BR1
BR2
SHIELD NO INSTALLATION
ROTATOR LEFT
ROTATOR RIGHT
TO MCI MODULE
MCI–MODULILLE
A3
ValiD for 69 –> SAMPO Programs


Valid for 69 -> SAMPO Programs
MCC MODULE
LENGTH A
LENGTH B
SENSORS+
SENSORS –
SAW PULSES A
SAW PULSES B
SAW HOME SENSOR
POT. SENSOR–
DIAMETER B
DIAMETER A
POT. SENSOR+
DIAMETER A
DIAMETER B
SENSORS –
SENSORS +
DIAMETER 2 A
DIAMETER 2 B
BACK KNIVES CLOSE
KNIVES CLOSE
ROLLERS CLOSE
COLOUR 2
COLOUR 1
SAW BAR
SAW MOTOR
FEED BACKWARD
FEED FORWARD
MASS HANDLING/MEASURING WHEEL OUT
FEED BACKWARD ON/OFF
FEED FORWARD ON/OFF
TILT DOWN
TILT UP
BACK KNIVES PRESSURE
BACK KNIVES OPEN
KINVES PRESSURE
KNIVES OPEN
ROLLERS PRESSURE
ROLLERS OPEN
TO MCI MODULE
MCI-MODULLE
YELLOW-GREEN
U1
V2
W3
BR1
BR2
SHIELD NO INSTALLATON
ROTATOR LEFT
ROTATOR RIGHT
Product
motomit IT
KETO NISULA
MCC2212
HEAD MODULE
Sampo–rosenlew
Weight
Relation
Article
Draw
Design
Check
Approve
PP
06.03.08
Vers
01
File
Sampo PRO
15/17
A3


MCC MODULE
MCC2212
HEAD MODULE
motomit IT
Sampo–rosenlew
P1 LENGTH A
P2 LENGTH B
710 SENSORS+
31 SENSORS –
494A SAW PULSES A
494B SAW PULSES B
410 SAW HOME SENSOR
POT. SENSOR–
DIAMETER B
DIAMETER A
POT. SENSOR+
SAW MOTOR 484
FEED BACKWARD 491
FEED FORWARD 490
MASS HANDLING/MEASURING WHEEL OUT 482A
ROTATOR FLOAT 485
TILT FLOAT 487A
TILT DOWN 487
TILT UP 481
BACK KNIVES PRESSURE 457D
BACK KNIVES OPEN 456
KINVES PRESSURE 492D
KNIVES OPEN 493
ROLLERS PRESSURE 482D
ROLLERS OPEN 483
BACK KNIVES CLOSE 457
KNIVES CLOSE 492
ROLLERS CLOSE 482
COLOUR 2 438
COLOUR 1 437
SAW BAR 470
408 ROTATOR LEFT
409 ROTATOR RIGHT
TO MCI MODULE
MCI–MODULILLE
YELLOW–GREEN
U1
V2
W3
BR1
BR2
SHIELD NO INSTALLATION
ValiD for 69 –> SAMPO Programs


INSTALLATION CONNECTOR
MONITOR
RED
GREEN
BLUE
YELLOW
ORANGE
BLACK
X23:5
X23:6
X23:4
X23:3
X23:2
X23:1
X38:5
X38:8
R13
22 OHM 6W
X27:47
X58:47
X67:1
X67:2
ACTUATOR NALLI
X27:46
X58:46
X66:2
X58:45
X27:45
X66:3
X11:6
X11:7
H4
H5
ALARM LAMP
SIGNAL HORN
DECTOR TUNNISTIMET
2 2 2 2
3 3 3 3
R 9,09k ohmia
1-18R
X39:2
F24
10A
X43:8
X56
MUUTOS
VAOS = VALMIIT OSAT
1/2VA = 1/2 VALMIIT OSAT
VAKE = VAIHTOKELPOISUUS
V = VANHUTTAA
E = EMÄNNÖITÄVÄN
K = KÄYTETYÄÄN
S = VARASTOIDAAN
M = MYYDÄÄN
R = ROMUTETAAN
VAOS
1/2VA
VAKE
MALLI
ALKAEN
MUUTTAJA PVM
1046 PRO
SÄHKÖ
323
PIIRT SK 10/08
PUUMURI
JAOS
ALKAEN
SUPIDE
HYV
TARK
VIITE
AINE
KPL
NIMI
SCHEMATIC FOREST MACHINE
NO
sampo ROSENLEW
UUSI PIIR.
AIK. PIIR.
SIVU 17/17
YHT.
PIIR.NO 3R 860652

1046PRO ELECTRICAL PARTS

A1	MCI module
A2	Mitron MCKC03 switch module
A3	Mitron MCC Head module
A4	Pc 24Vdc
A5	Pc 12Vdc
A6	A4 printer
A7	phone modem
A8	motor heater clockswitch
A9	motor heater remote control
A10	Epec 2021 HUB
A11	Epec 2040 Display
A12	Epec 2020 head module
A13	Epec 2023 switch module
B1	Crane tilt sensor front/back
B2	fuel sensor
B3	hydraulics temperature sensor
B4	
B5	Foot pedal
B6	Hand throttle
C1	printercapacitor
C2	time delay light capacitor
E1	worklight top
E2	worklight top
E3	worklight top
E4	worklight top
E5	worklight extra light
E6	worklight left door
E7	worklight right door
E8	worklight cabin front module left
E9	worklight cabin front module right
E10	worklight drivelightarm right
E11	worklight drivelightarm left
E12	boom bottom light left
E13	boom bottom light right
E14	roof light left side back
E15	roof light right side back
E16	roof light left side front
E17	roof light right side front
E18	roof light left front angle
E19	roof light right front angle
E20	roof light left front middle
E21	roof light right front middle
E22	roof light left front inside
E23	roof light right front inside
E24	roof light left back angle
E25	roof light right back angle
E26	boom worklight
E27	worklight motor room
E28	electrical room light
E29	rotator light
E30	blinker right front
E31	blinker right back
E32	blinker left back
E33	blinker left front
E34	park light left front
E35	park light right front
E36	park light left back
E37	park light right back
E38	drive light left
E39	drive light right
E40	drive light long left
E41	drive light long right
E42	cabin inside light

FUSE

F1	+12V socket cabin
F2	radio,time delay light control
F3	PC +12V
F4	modem +12V
F5	A4 printer +12V (meassure shears)
F6	radio memory
F7	motor heater
F8	worklight (time delay)
F9	motor heater water pump
F10	motor heater clock and remote control ,MD3 rtc,
F11	cabin warm blower
F12	+Bat measuring device
F13	worklight
F14	worklight
F15	start motor solenoid
F16	cabin AC system
F17	worklight, voltage reduce U1
F18	worklight
F19	worklight
F20	worklight
F21	worklight
F22	measuring device
F23	hazard blinker
F24	fire protection
F25	rotate blinker light
F26	joystics
F27	PC display heater
F28	horn
F29	PC voltage reduce
F30	cabin inside light and electrical room light
F31	worklight motor room
F32	magn.valve four drive, front drive
F33	XA2, Iqan joystics, generator D+, CTA ignition
F34	blinkker relay
F35	windscreen motor, wash, switch symbol light
F36	cabin blower control, clockswitch, lubrication
F37	measuring knife
F38	drivepump angle sensor,control fourdrive,front drive, front-back lock, body link lock,hydr.pressure filter
F39	MD3 display
F40	vacuum pump
F41	AC kompressor
F42	bilnker right
F43	seat kompressor,heater,tilt
F44	fire protection
F45	
F46	park light
F47	joystics

F48 iqan XA2
F49 blinker left
F50 drive light left front
F51 drive light right front
F52 fuelpumps
F53 drive light long left
F54 drive light long right
F55 +Bat main fuse battery box
F56 main fuse +30 back carrier
F57 CTA motor control box
F58 motor grid heater
F59 hydraulics fullpump
F60 socket motor room
F61 motor heater control remote

H1
H2 generator symbol light
H3 alarm light
H4 horn
H5 fire protection light
fire protection horn

RELAY
K1 semiconductor delay time light
K2 worklight
K3 worklight
K4 hydr.fullpump control
K5 windscreen one sweep
K6 motor heater extra water pump
K7 start motor
K8 worklight
K9 Iqan, XA2, joystics
K10 blinker
K11 alarm
K12 motor heater control blower
K13 worklight
K14 worklight
K15 option
K16 AC compressor 12V new AC
K17 fuel pumps, fuel valve
K18 worklight
K19 worklight
K20 option
K21 four drive, front drive
K22 motor grid heater

K25 solenoid hydr. fullpump
K26 cabin blower
K27 AC thermostat
K28 FAN controller

MOTOR
M1 start
M2 fuel lift pump CTA
M3 vacuum pump
M4 fuel extra lift pump
M5 seat kompressor air bolster
M6 seat blower
M7 seat air suspension
M8 heater device blower
M9 extra heater
M10 extra heater water pump
M11 windscreen sweep
M12 windscreen wash
M13 hydraulics fullpump
M14 heater device blower 12V, new AC

G1 battery 115Ah
G2 battery 115Ah

Q1 electrical main switch

SWITCH
S1 ignition
S2 main switch control cabin
S3 main switch control back carrier
S4 hazard switch
S5 rotate light
S6 hazard light
S7 blinker
S8 drive light
S9 drive change
S10 worklight
S11 worklight
S12 worklight
S13 worklight motor room
S14 cabin inside light
S15 horn
S16 seat heater
S17 heater device blower HI.ME. LO
S18 thermostat
S19 AC pressure switch
S20 motor heater control remote reset
S21 windscreen sweep
S22 windscreen wash
S23 hydraulics fullpump switch
S24 limit switch hydraulicstank top
S25 PC
S26 foot pedal drive change

S28 limit switch gear 1
S29 limit switch gear 2
S30 door switch
S31 body link slow end
S32 tilt automatic reset/straightening
S33 windscreen one switch
S34 limitswitch hydraulicstank bottom limit
S35 motor air filter sensor
S36 hydraulics suck filter
S37 hydraulics pressure filter
S38 hydraulics return filter
S39 inductive sensor drive pump angle
S40 four drive
S41 front lock
S42 limit switch front lock
S43 back lock
S44 body link lock

S45 brake
S46 measuring device
S47 rpm diesel
S48 boom automatic on /off
S49 elecrtical room light
S50 drive/thresing switch
S51 lift boom end delay

EXCIDOR SWITCHES
S1 program
S2 program
S3 program
S4 program
S5 program
S6 program
S7 program
S8 program
S9 program
S10 program
S11 program
S12 slow back
S13 slow front
S14 feed back
S15 feed front
S16 saw
S17 control colour test
S18 stump handling
S19 tree 1
S20 tree 2
S21 colour B
S22 tree 3
S23 tree4
S24 colour A
S25 change
S26 back knife
S27 rollers open
S28 front knife open
S29 empty
S30 tilt up
S31 tilt down
S32 boom tilt straightening
S33 windscreen on sweep
S34 drive direction joystics

U1 voltage reduce
U2 voltage reduce

R1-R5 leds front resistor
R6 radio memory
R7 hydr.alarm front resistor
R8 hydr.temperature front resistor
R9 fuel sensor front resistor
R10 radio memory
R11 rpm diesel
R12 rpm diesel
R13 fire protection
R14 motor grid heater
R15 forward speed potentiometer
R16 blower resistor
R17 body link slow sensor
R18 8k fan rpm, Eber
R19 5,5K fan rpm
R20 470 fan rpm
R21 12K fan rpm 1
R22 8,2K fan rpm 2
R23 3,3K fan rpm 3
R24 470 fan rpm 4
R25 AC sensor

DIODE
V1-V5 alarm leds
V6 radio/delay time light
V7 zenerdiode return filter
V8 zenerdiode hydr.pressure filter
V9 zenerdiode hydr.sucs filter
V10 zenerdiode motor air filter
V11 D+ generator
V12 rotator left option
V13 steering left
V14 rotator right option
V15 steering right
V16 delay time light control
V17 hydr.sucs filter
V18 hydr. pressure filter
V19 hydr.pressure filter
V20 door switch mckc
V21
V22 Diodi, Fan rpm
V23 Diodi, Fan rpm
V24 Diodi, Fan rpm

MAGNETIC VALVE
Y1 swinging right
Y2 swinging left
Y3 up
Y4 down
Y5 in
Y6 out
Y7 steering left
Y8 steering right
Y9 tilt left
Y10 tilt right
Y11 rotator left
Y12 rotator right
Y13 fuel valve
Y14 front lock
Y15 back lock
Y16 body link
Y17 front brake
Y18 front drive
Y19 four drive
Y20 four drive
Y21 four drive
Y22 four drive
Y23 AC kompressor
Y24 vacuum pump

Y25 drive pump forward
Y26 pressure pump 1 on off
Y27 pressure pump 2 propo
Y28 pump 3 tree handling
Y29 drive pump back

CONNECT
X1:1 worklight right, left lightarm
X1:2 valve swinging right
X1:3 valve swinging left
X1:4 socket
X1:5 worklight boom bottom
X1:6 worklight boom
X1:7 valve up
X1:8 valve down
X1:9 valve in
X1:10 valve out
X1:11 valve steering left
X1:12 valve steering right
X1:13 valve tilt left
X1:14 valve tilt right
X1:15 valve rotator left
X1:16 valve rotator right
X1:17 valve rotator left, right
X1:18 valve tilt left, right
X1:19 valve steering left. right
X1:20 valve in, out
X1:21 valve up, down
X1:22 valve swinging left, right
X1:23 differential gear lock limit switch
X1:24 boom sensor -5V
X1:25 boom sensor+5V
X1:26 boom tilit sensor signal
X1:27 boom sensor -5V
X1:28 boom sensor +5V
X1:29 windscreen wash
X1:30 horn
X1:31 pump1 pressure
X1:32 pump 2 pressure
X1:33 pump 2 pressure ground
X1:34 worklight cabin module
X1:35 boom sensor signal
X1:36 valve front lock
X1:37 park light
X1:38 blinker left
X1:39 drive light left
X1:40 drive light long left
X1:41 empty
X1:42 empty
X1:43 blinker right
X1:44 drive light right
X1:45 drive light long right
X1:46 empty
X1:47 valve brake

X2:1 boom sensor +5V
X2:2 boom sensor -5V
X2:3 boom sensor signal
X2:4 boom tilt sensor +5V
X2:5 boom tilt sensor -5V
X2:6 boom tilt sensor signal

X3:1 boom bottom worklight +24V
X3:2 boom bottom worklight ground
X3:3 boom bottom worklight +24V
X3:4 boom bottom worklight ground

X4:1 boom worklight +24V
X4:2 boom worklight ground

X5:1 park light left
X5:2 park light left
X5:3 drive light left
X5:4 drive light long left
X5:5 lights ground left

X6:1 worklight left lightarm +24V
X6:2 worklight left lightarm ground

X7:1 park light right
X7:2 blinker right
X7:3 drive light right
X7:4 drive light long right
X7:5 lights ground right

X8:1 worklight right lightarm +24V
X8:2 worklight right lightarm ground

X9:1 worklight roof left front inside
X9:2 worklight roof left front middle
X9:3 worklight roof left front angle
X9:4 worklight roof left side front
X9:5 worklight roof left side back
X9:6 worklight roof left back angle
X9:7 worklight roof right front inside
X9:8 worklight roof right front middle
X9:9 worklight roof right front angle
X9:10 worklight roof right side front
X9:11 worklight roof right side back
X9:12 worklight roof right side back
X9:13 worklight roof top
X9:14 worklight roof top
X9:15 worklight roof extra top
X9:16 worklight roof top
X9:17 worklight roof top
X9:18 rotate light
X9:19 rotate light
X9:20 rotate light
X9:21 rotate light
X9:22 empty
X9:23 empty
X9:24 empty

X10:1 worklight
X10:2 worklight
X10:3 worklight

X10:4 worklight
X10:5 worklight roof extra top
X10:6 worklight roof top
X10:7 empty
X10:8 empty
X10:9 empty

X11:1 radio +12V
X11:2 radio -12V PC roof
X11:3 limit switch door
X11:4 limit switch door
X11:5 alarm light
X11:6 fire protection alarmlight +
X11:7 fire protection alarmlight -
X11:8 cabin inside light
X11:9 rotate light
X11:10 radio mute
X11:11 PC +12V roof
X11:12 PC preheater roof +24V

A Radio
X12:1 emty
X12:2 emty
X12:3 radio mute
X12:4 +12V
X12:5 antenna
X12:6 emty
X12:7 +12V
X12:8 ground

B Radio
X13:1 empty
X13:2 empty
X13:3 speaker right +
X13:4 speaker right -
X13:5 speaker left +
X13:6 speaker left -
X13:7 empty
X13:8 empty

motor heater clock switch
X14:1 backlight
X14:2 start signal
X14:3 empty
X14:4 ground
X14:5 empty
X14:6 empty
X14:7 empty
X14:8 diagnostic signal
X14:9 empty
X14:10 +24V (+15)
X14:11 +24V (+Bat)
X14:12 ground

X15:1 food pedal +24V
X15:2 food pedal signal

X16:1 P2 foot pedal supply +Vref
X16:2 P1 foot pedal supply +Vref
X16:3 P1 foot pedal ground -Vref
X16:4 P1 foot pedal signal
X16:5 P2 foot pedal ground -Vref
X16:6 P2 foot pedal signal

MD3 C1 GREY
X17:1 ground
X17:2 CanL A XA2
X17:3 CanL B measuring device
X17:4 CanL C CTA
X17:5 RS 232
X17:6 reserved
X17:7 RTC memory +24V
X17:8 RS232
X17:9 Can H C CTA
X17:10 Can H C B measuring device
X17:11 Can H A XA2
X17:12 +24V (+30)

MD3 C2 BLACK
X18:1 fuel sensor signal
X18:2 hydr.temperature signali
X18:3 boom sensor signal
X18:4 body link slow sensor signal
X18:5 -Vref
X18:6 Usb D-
X18:7 Usb D+
X18:8 +Vref
X18:9 Vin E
X18:10 Vin F
X18:11 hydr. alarm, motor air filter signal
X18:12 alarm relay

X19:1 hand throttle +5V
X19:2 hand throttle signal
X19:3 hand throttle 0V

X20:1 measuring device 24V
X20:2 measuring device 24V
X20:3 measuring device 24V
X20:4 measuring device ground
X20:5 measuring device ground
X20:6 measuring device ground

X21:1 measuring device Can H
X21:2 measuring device Can L
X21:3 empty

X22:1 address 0
X22:2 valve boom up
X22:3 valve drive pump
X22:4 valve boom tilt
X22:5 valve boom in / out
X22:6 valve swinging
X22:7 valve steering / rotator
X22:8 valve front lock
X22:9 relay four drive
X22:10 foot pedal signal P1

X22:11 foot pedal signal P2
X22:12 Rpm signal
X22:13 boom tilt sensor signal
X22:14 address 0
X22:15 ground
X22:16 valve boom up
X22:17 drive pump forward
X22:18 boom tilt valve
X22:19 valve boom in
X22:20 valve swinging left
X22:21 valve left steering / rotator
X22:22 valve back lock
X22:23 start motor control
X22:24 front lock switch signal
X22:25 back lock switch signal
X22:26 Can H 2
X22:27 Can H
X22:28 Supply +24V
X22:29 -Vref
X22:30 boom valve down
X22:31 valve drive pump back
X22:32 valve boom tilt left
X22:33 valve boom out
X22:34 valve swinging out
X22:35 valve rotator/steering right
X22:36 bodylink and brake switch control
X22:37 rotator/ steering relay
X22:38 ignition start signal
X22:39 four drive switch
X22:40 Can L 2
X22:41 Can L
X22:42 +Vref

X23:1 fire protection +Bat
X23:2 fire protection +30
X23:3 fire protection ground
X23:4 fire protection alarmlight and horn
X23:5 fire protection shoot
X23:6 fire protection sensor
X23:7
X23:8
X23:9 ground

X24:1 bodylink slow sensor +24V
X24:2 bodylink slow sensor ground
X24:3 bodylink slow sensor signal

White rectangular connector
X25:1 windscreen ground
X25:2 windscreen backcurrent
X25:3 windscreen +24V
X25:4 empty
X25:5 windscreen gear 2
X25:6 windscreen gear 1
Black round connector
X25:1 windscreen gear 1
X25:2 windscreen +24V
X25:3 windscreen backcurrent
X25:4 windscreen gear 2
X25:5 windscreen ground

X26:1 Can H joystics
X26:2 Can L joystics
X26:3 MD3 Vin E optio
X26:4 MD3 Vin F optio
X26:5 mckc rotator optio
X26:6 mckc rotator optio
X26:7 mckc rotator optio
X26:8 +24V joystics
X26:9 ground joystics
X26:10 windscreen one sweep relay
X26:11 foot pedal signal
X26:12 gear 1
X26:13 gear 2
X26:14 door signal
X26:15 tilt automatic on off
X26:16 door signal (EPEC)
X26:17 tree handling valve (EPEC)
X26:18 optio
X26:19 optio
X26:20 optio
X26:21 optio
X26:22 optio
X26:23 keyboard +24V F26
X26:24 optio

X27:1 vacuum pump
X27:2 drive pump sensor signal
X27:3 drive pump sensor, hydr.pressure filter +24V
X27:4 fuel pumps, valve
X27:5 start motor
X27:6 four drive valve
X27:7 drive pump valves
X27:8 drive pump valve forward
X27:9 drive pump valve back
X27:10 back lock valve
X27:11 bodylink lock valve
X27:12 generator D+
X27:13 CTA ignition
X27:14 fuel pumps relay
X27:15 main switch
X27:16 main switch
X27:17 main switch symbol light
X27:18 blinker right
X27:19 blinker left
X27:20 motor heater extra water pump
X27:21 front drive valve
X27:22 AC pressure switch
X27:23 motor heater start signal
X27:24 motor heater diagnostic
X27:25 motor heater control cabin blower
X27:26 hydr.full pump switch
X27:27 hydr.full pump solenoid
X27:28 Can H CTA

X27:29 Can L CTA
X27:30 fuel sensor signal
X27:31 hydr.temperature signal
X27:32 park lights
X27:33 optio
X27:34 motor heater +24V
X27:35 fuel/ hydr.temperature -Vref
X27:36 fire protection ground
X27:37 optio
X27:38 motor room worklight
X27:39 tree handling valve
X27:40 hydraulics tank level sensor signal
X27:41 motor air filter
X27:42 hydraulics sucs filter
X27:43 hydraulics pressure filter
X27:44 hydraulics return filter
X27:45 fire protection sensor ground
X27:46 fire protection sensor and shoot ground
X27:47 fire protection shoot

X28:1 cabin blower resistor LO
X28:2 empty

X29:1 cabin blower control, clockswitch, lubrication system
X29:2 lubrication system

X30:1 PC +12V
X30:2 PC preheater +24V
X30:3
X30:4
X30:5 voltage reduce U2
X30:6
X30:7 +Bat 24 measuring device
X30:8 PC +24V
X30:9 PC groun

X31:1 motor heater remote control +24V +Bat
X31:2 motor heater remote control ground
X31:3 motor heater remote control signal

X32:1 seat heater +24V
X32:2 seat motor
X32:3 seat ground

X33:1 cabin connector X1:41
X33:2 cabin connector X1:42
X33:3 cabin connector X1:46

X34:1 MCI module pump 2 ground
X34:2 MCI module pump 1 on off
X34:3 MCI module pump 2 propo
X34:4 MCI module pump 3
X34:5

x35:1 worklight boom bottom +24V
x35:2 worklight boom bottom ground

X36:1 PC +12V
X36:2 phone system +12V
X36:3 printer +12V
X36:4 cabin socket +12V
X36:5 RPM diesel signal
X36:6 radio +12V
X36:7 RPM diesel signal R12
X36:8 delay time light
X36:9 worklight

X37:1 motor heater +24V (+Bat)
X37:2 motor heater blower relay
X37:3 motor heater extra water pump
X37:4 empty
X37:5 motor heater start signal
X37:6 blower resistor LO
X37:7 motor heater clockswitch,remote control +24V
X37:8 motor heater control relay
X37:9 blower speed LO

x38:1 ignition 58 R position
x38:2 blower switch AC position
x38:3 thermostate supply
x38:4 vacuum pump
x38:5 fire protection resistor
x38:6 blinker right
x38:7 +12v radio,delay time worklight
x38:8 fire protection resistor
x38:9 blinker right

x39:1 fire protection F44
x39:2 fire protection F44
x39:3 optio
x39:4 seat electrisity
x39:5 fuse F46
x39:6
x39:7 fuse F43
x39:8 empty
x39:9 park light fuse F46

x40:1 worklight
x40:2 relay control K18
x40:3 worklight
x40:4 relay control K13
x40:5 start motor relay
x40:6 cabin blower
x40:7 fuse F12
x40:8 four drive relay
x40:9 start motor solenoid

x41:1 worklight
x41:2 relay control K19
x41:3 worklight extra roof top
x41:4 relay K14
x41:5 relay K18
x41:6 worklight
x41:7 relay K2
x41:8 voltage reduce U1
x41:9

x42:1 optio
x42:2 optio
x42:3 optio
x42:4 steering left
x42:5 optio
x42:6 optio
x42:7 steering/rotator left
x42:8 steering/rotator right
x42:9 steering right

X43:1 iqan XA2 +24V
X43:2 measuring device switch supply
X43:3 worklight
X43:4 joystics supply
X43:5 relay K3
X43:6 rotate light
X43:7 alarm stop
X43:8 fire protection supply
X43:9 hazard switch supply

X44:1 PC switch supply
X44:2 hydr.full pump control
X44:3 cabin inside light
X44:4 switch horn and socket
X44:5 hydr.full tank control
X44:6 valve front drive
X44:7 PC display heater
X44:8 gear switch,drive direction,door switch,bodylink sensor and keyboard F26
X44:9 valve four drive

X45:1 steering valve
X45:2 relay steering/thresing
X45:3 optio
X45:4 rotator/steering K16
X45:5 empty
X45:6 blinker F49
X45:7 delay time light capacitor
X45:8 delay time light switch
X45:9 blinker right

X46:1 fuel lift pump F52
X46:2 drive light long left
X46:3 drive lights long
X46:4 drive lights
X46:5 fuel lift pump relay
X46:6 drive light long right
X46:7 drive light right
X46:8 drive light left
X46:9 fuel lift pumps

X47:1 blinker relay C pole
X47:2 worklight switch supply, hydr.tank pump control
X47:3 generator D+
X47:4 alarm light
X47:5 windscreen relay
X47:6 generator D+
X47:7 blinker relay 49a pole
X47:8 alarm relay
X47:9 blinker relay 49

X48:1 lubrication system
X48:2 windscreen back current
X48:3 switch supply four drive, back lock, ind.sensor
X48:4 windscreen ,wash
X48:5 measuring knife F37
X48:6 Md3 +24V
X48:7 switch blinker
X48:8 ignition +15
X48:9 windscreen back current

X49:1 hydr.sucs filter
X49:2 hydr.level sensor
X49:3 motor air filter
X49:4 hydr.pressure switch
X49:5 alarm signal
X49:6 +Vref
X49:7 hydr.return filter
X49:8 fuel sensor signal
X49:9 hydr.temperature signal

X50 PCB +12V
X51 PCB +12V
X52 PCB +24V +Bat
X53 PCB +24V +30
X54 PCB ground
X55 PCB +24V +30
X56 PCB +24V +30
X57 PCB +24V +30
x58 PCB +24V +15

X58:1 vacuum pump
X58:2 drive pump sensor signal
X58:3 drive pump sensor, hydr.pressure filter +24V
X58:4 fuel pumps, valve
X58:5 start motor
X58:6 four drive valve
X58:7 drive pump valves
X58:8 drive pump valve forward
X58:9 drive pump valve back
X58:10 back lock valve
X58:11 bodylink lock valve
X58:12 generator D+
X58:13 CTA ignition
X58:14 fuel pumps relay
X58:15 main switch
X58:16 main switch
X58:17 main switch symbol light
X58:18 blinker right
X58:19 blinker left
X58:20 motor heater extra water pump
X58:21 front drive valve
X58:22 AC pressure switch

X58:23 motor heater start signal
X58:24 motor heater diagnostic
X58:25 motor heater control cabin blower
X58:26 hydr.full pump switch
X58:27 hydr.full pump solenoid
X58:28 Can H CTA
X58:29 Can L CTA
X58:30 fuel sensor signal
X58:31 hydr.temperature signal
X58:32 park lights
X58:33 optio
X58:34 motor heater +24V
X58:35 fuel/ hydr.temperature -Vref
X58:36 fire protection ground
X58:37 optio
X58:38 motor room worklight
X58:39 tree handling valve
X58:40 hydraulics tank level sensor signal
X58:41 motor air filter
X58:42 hydraulics sucs filter
X58:43 hydraulics pressure filter
X58:44 hydraulics return filter
X58:45 fire protection sensor ground
X58:46 fire protection sensor and shoot ground
X58:47 fire protection shoot

X59:1 Can H in
X59:2 Can L in
X59:3 Can H out
X59:4 Can L out
X59:5 ground
X59:6 +24V

X60:1 drive pump ind.sensor +24V
X60:2 empty
X60:3 drive pump ind.sensor ground
X60:4 drive pump ind.sensor signal

X61:1 motor heater extra water pump
X61:2 motor heater extra water pump

X62:1 hydraulics temperature sensor supply and signal
X62:2 hydraulics temperature sensor -Vref

X63:1 vacuum pump +24V
X63:2 vacuum pump ground

X64:1 hydraulics level sensor bottom signal
X64:2 hydraulics level sensor bottom ground

X65:1 hydraulics pressure filter signal
X65:2 hydraulics pressure filter ground
X65:3 hydraulics pressure filter +24V

X66:1 ground
X66:2 fire protection temperature sensor
X66:3 fire protection temperature sensor

X67:1 fire protection shoot +24V
X67:2 fire protection shoot ground

X68:1 empty
X68:2 fuel lift pump ground
X68:3 fuel lift pump +24V

X69:1 water sensor
X69:2 water sensor
X69:3 water sensor

X70:1 blinker left back
X70:2 park light left back
X70:3 ground
X70:4 blinker right back
X70:5 park light right back
X70:6 ground
X70:7

x71:1 hydraulics level sensor top switch
x71:2 hydraulics level sensor top thermistore

X72:1 hydraulics full tank thermistore
X72:2

X73:1 worklight +24V
X73:2 worklight ground

X74:1 fuel extra pump +24V
X74:2 fuel extra pump ground

X75:1 motor heater fuel pump +24V
X75:2 motor heater fuel pump ground

X76:1 motor heater +24V
X76:2 motor heater ground
X76:3 motor heater control blower
X76:4 motor heater fuel pump
X76:5 motor heater diagnostic
X76:6 empty
X76:7 motor heater start signal
X76:8 empty

X77:1 blinker right
X77:2 park light
X77:3 ground
X77:4 empty

X78:1 motor air filter signal
X78:2 motor air filter ground
CTA
x79:1
x79:2 +24V
x79:3 +24V
x79:4
x79:5 ground
x79:6 ground
x79:7

x79:8 +24V
x79:9 +24V
x79:10 ground
x79:11 ground
x79:12
x79:13
x79:14
x79:15
x79:16
x79:17
x79:18
x79:19
x79:20
x79:21 ID module
x79:22
x79:23
x79:24
x79:25
x79:26
x79:27
x79:28
x79:29 ID module
x79:30
x79:31
x79:32
x79:33
x79:34 Can L 2
x79:35 Can H 1
x79:36
x79:37
x79:38
x79:39
x79:40 Ignition +24V (+15)
x79:41
x79:42
x79:43
x79:44
x79:45
x79:46
x79:47 water sensor
x79:48
x79:49
x79:50 water sensor
x79:51
x79:52 ID module Can L
x79:53 ID module Can H
x79:54
x79:55 fuel lift pump Do1 control
x79:56
x79:57
x79:58
x79:59
x79:60
x79:61
x79:62
x79:63
x79:64
x79:65 water sensor
x79:66
x79:67
x79:68
x79:69
x79:70
x79:71
x79:72
x79:73
x79:74
x79:75
x79:76
x79:77
x79:78
x79:79
x79:80
x79:81
x79:82
x79:83
x79:84
x79:85
x79:86
x79:87
x79:88
x79:89

X80:1 ID module
X80:2 ID module
X80:3 ID module
X80:4 ID module

X81:1 optio
X81:2 optio
X81:3 optio

X82:1 AC kompressor
X82:2 empty

X83:1 windscreen one sweep
X83:2 F26 +30
X83:3 empty
X83:4 empty
X83:5 empty
X83:6 empty
X83:7 empty
X83:8 empty
X83:9 empty

X84:1 seat heater switch +24V
X84:2 ground

X85:1 seat kab 569 heater,blower, air suspension
X85:2 ground

X86:1 seat air suspension
X86:2 ground

X87:1 Can H
X87:2 Can L

X87:3 MD3 Vin E
X87:4 MD3 Vin F
X87:5 +Bat iqan joystics
X87:6 -Bat iqan joystics
X87:7 drive direction foot pedal
X87:8 gear 1
X87:9 gear 2
X87:10 door switch->diode Mckc Di1
X87:11 tilt automatic on off
X87:12 optio
X87:13 optio
X87:14 optio
X87:15 optio
X87:16 optio
X87:17 optio
X87:18 optio
X87:19 optio
X87:20 optio
X87:21 optio
X87:22 empty
X87:23 empty
X87:24 empty

X88:1 optio
X88:2 tree handling valve (EPEC)
X88:3 optio
X88:4 optio
X88:5 optio
X88:6 optio
X88:7 optio
X88:8 optio
X88:9 empty

X89:1 right joystics /EME drive thresing
X89:2 right joystics /EME drive thresing
X89:3 right joystics +Bat
X89:4 right joystics -Bat
X89:5 left joystics Can H
X89:6 left joystics Can L
X89:7 left joystics -Bat2
X89:8 left joystics +Bat2
X89:9
X89:10
X89:11 left joystics +Bat
X89:12 left joystics -Bat

X90:1 drive speed potentiometer -Vref
X90:2 drive speed potentiometer +Vref
X90:3 drive speed potentiometer siognal

X91:1 +12V phone system
X91:2 +12V A4 printer
X91:3 voltage reduce U1 ground
X91:4 radio mute
X91:5 voltage reduce U2 ground
X91:6 empty
X91:7 empty
X91:8 empty
X91:9 empty

X92:1 boom light +24V
X92:2 boom light ground
X92:3 boom bottom light +24V right
X92:4 boom bottom light ground right

X93:A boom sensor +5V
X93:B boom sensor -5V
X93:C boom sensor signal

X94:A boom tilt sensor +5V
X94:B boom tilt sensor -5V
X94:C boom tilt sensor signal

X95:1 tilt automatic reset/straightening
X95:2 drive direction switch
X95:3 steering/threshing switch
X95:4 empty
X95:5 empty
X95:6 empty
X95:7 empty
X95:8 empty
X95:9 empty

X96 PCB supply +24V (+15)

X97:1 +12V PC
X97:2 -12V PC
X97:3 PC preheater +24V

X98:1 measuring knife +24V
X98:2 measuring knife -24V

X99:1 supply S25 F29
X99:2 out connect X51
X99:3 ground
X99:4 out connect X30:2 and X91:5
X99:5 empty
X99:6 empty
X99:7 empty
X99:8 empty
X99:9 empty

X100:1 fan speed 2
X100:2 fan speed 3
X100:3 fan speed 4
X100:4 fan speed 1
X100:5 R17
X100:6 R17
X100:7 fan speed eber
X100:8 fan controller signal 0V
X100:9 fan controller signal

X101:1 K20 30
X101:2 K15 86
X101:3 K20 86

X102:1 air-conditioning thermostat
X102:2 air-conditioning thermostat
X102:3 air-conditioning thermostat ground

X103:1 fan speed switch +24v
X103:2 fan speed 1
X103:3 fan speed 2
X103:4 fan speed 3
X103:5 fan speed 4

X104:1 air-conditioning on/off
X104:2 air-conditioning on/off
AC panel light +24V
X105:1 AC panel light ground
X105:2

X106:1 fan controller signal +24V
X106:2 fan controller signal signal
X106:3 fan controller signal 0V

X107:1 air-conditioning thermostat
X107:2 air-conditioning thermostat

X108:1 air-conditioning thermostat
X108:2 air-conditioning thermostat

X109:A fuel sensor +24V
X109:B fuel sensor signal
X109:C fuel sensor GND